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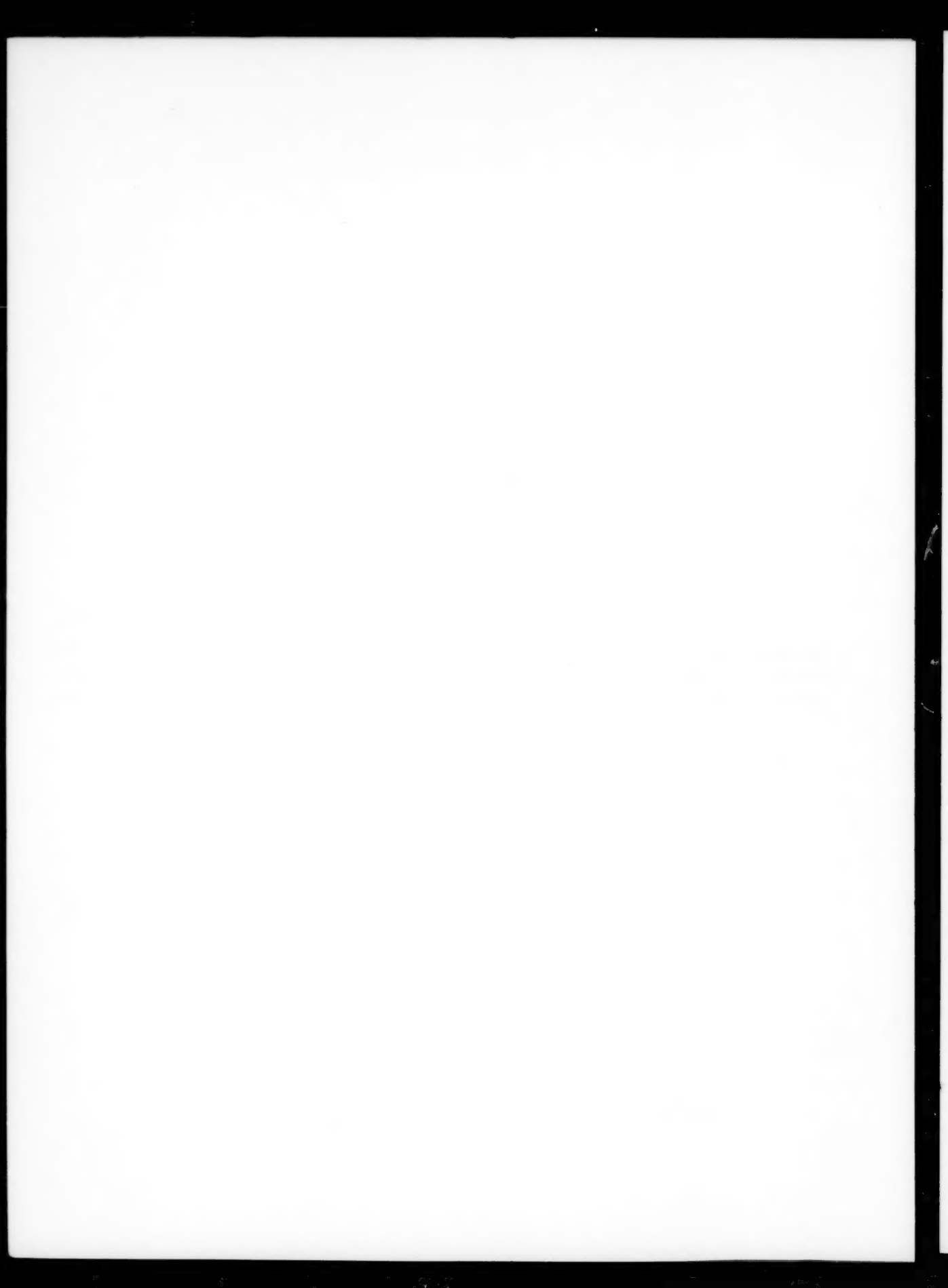
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CONTENTS

	<i>Page</i>	<i>Fiche</i>
AUTHOR INDEX	1	1-A4
SUBJECT HEADINGS	87	2-A1
SUBJECT INDEX	91	2-A4



1984 ANNUAL INDEX

AUTHOR INDEX

- AANNSTAD, PER A. Interstellar Polarization, Grain Growth, and Alignment: Erratum. *Per A. Aannestad and J. Mayo Greenberg*. **278**, 893, 35-E11 (1984) (Orig. paper in **272**, 551, 107-G6)
- AARONSON, M. Discovery of the First Carbon Star in NGC 6822. *M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman*. **277**, L9, 16-A9 (1984)
- AARONSON, MARC. AM-1: A Very Distant Globular Cluster. *Marc Aaronson, Robert A. Schommer, and Edward W. Olszewski*. **276**, 221, 3-C5 (1984)
- The Distances and Properties of a Sample of Sc I Galaxies. *Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould*. **278**, 475, 31-B9 (1984)
- A Distance to the Large Magellanic Cloud by Main-Sequence Fitting. *Robert A. Schommer, Edward W. Olszewski, and Marc Aaronson*. **285**, L53, 121-D11 (1984)
- AARSETH, SVERRE J. Alignments of Clusters of Galaxies as a Probe for Superclusters. *Avishai Dekel, Michael J. West, and Sverre J. Aarseth*. **279**, 1, 37-A6 (1984)
- The Spatial Correlation Function of Galaxies Confronted with Theoretical Scenarios. *Avishai Dekel and Sverre J. Aarseth*. **283**, 1, 86-A6 (1984)
- ABBOTT, DAVID C. 2 to 20 Micron Observations of Mass Loss from Early-Type Stars. *David C. Abbott, C. M. Telesco, and Sidney C. Wolff*. **279**, 225, 39-D14 (1984)
- The Detection of Variable, Nonthermal Radio Emission from Two O Type Stars. *David C. Abbott, J. H. Bieging, and E. Churchwell*. **280**, 671, 57-B10 (1984)
- ABBOTT, L. F. Large-Scale Anisotropy of the Microwave Background and the Amplitude of Energy Density Fluctuations in the Early Universe. *L. F. Abbott and Mark B. Wise*. **282**, L47, 85-A4 (1984)
- ABRAMOPOULOS, FRANK. The Radial X-Ray Brightness Profile of the Coma Cluster. *Gary A. Chanan and Frank Abramopoulos*. **287**, 89, 134-A1 (1984)
- ABRAMOWICZ, MAREK A. Local Stability of Thick Accretion Disks. I. Basic Equations and Parallel Perturbations in the Negligible Viscosity Case. *Marek A. Abramowicz, Mario Livio, Tsvi Piran, and Paul J. Wiita*. **279**, 367, 41-A6 (1984)
- ABT, HELMUT A. The Nature of the Visual Companions of Ap and Am Stars. *Helmut A. Abt and Octavio Cardona*. **276**, 266, 3-F10 (1984)
- Be Stars in Binaries. *Helmut A. Abt and Octavio Cardona*. **285**, 190, 112-A10 (1984)
- Spectroscopic Tests of Photoelectric Stellar Classification of Abnormal Stars. *Helmut A. Abt*. **285**, 247, 112-E12 (1984)
- In Memoriam Jeanne Hopkins. *Helmut A. Abt*. **286**, 1, 122-A6 (1984)
- ACTION, L. W. SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. *A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley*. **279**, 866, 47-C8 (1984)
- ACTION, LOREN W. A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. *Todd A. Gunkler, Richard C. Canfield, Loren W. Acton, and Alan L. Kiplinger*. **285**, 835, 120-E7 (1984)
- ADAMS, N. G. Dissociative Recombination Coefficients for H $_2^+$, HCO $^+$, N $_2$ H $^+$, and CH $_3^+$ at Low Temperature: Interstellar Implications. *D. Smith and N. G. Adams*. **284**, L13, 103-A14 (1984)
- ADAMS, NIGEL G. Theoretical Reinvestigation of Hydrocarbon and Cyanoacetylene Abundances in TMC-1. *Eric Herbst, Nigel G. Adams, and David Smith*. **285**, 618, 118-C7 (1984)
- ADAMS, PETER J. Primordial Gravitational Waves and the Blackbody Radiation Anisotropy. *Peter J. Adams, Ronald W. Hellings, and Robert L. Zimmerman*. **280**, L39, 60-D4 (1984)
- ADE, P. A. R. Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Noli, and J. V. Radostitz*. **280**, 102, 50-B7 (1984)
- ADELMAN, SAUL J. Spectrophotometry of the RS Canum Venaticorum Stars. II. A Study of Seven Systems from 4000-11000 Angstroms. *Steven N. Shore and Saul J. Adelman*. **54**, 151, 2-G8 (1984) (Abstr. in **275**, 929, 147-F2)
- AFRICANO, JOHN L. Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. *Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry*. **282**, 226, 76-D2 (1984)
- The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley*. **285**, 202, 112-B8 (1984)
- AGGARWAL, K. M. Electron Excitation Rate Coefficients for Transitions from the 1s 2 1 S Ground State to the 1s2s 1 3S and 1s2p 1 3P o Excited States of Helium. *K. M. Aggarwal, A. E. Kingston, and M. R. C. McDowell*. **278**, 874, 35-D6 (1984)
- Electron Impact Excitation Rates for Fine-Structure Transitions in Ne v and Si ix: An R-Matrix Approach. *K. M. Aggarwal*. **54**, 1, 1-A2 (1984) (Abstr. in **275**, 926, 147-E13)
- Electron Impact Excitation of Forbidden Transitions in Mg II. *K. M. Aggarwal*. **56**, 303, 27-A13 (1984) (Abstr. in **285**, 874, 121-A5)
- AGGARWAL, S. S. Wave-Wave Interaction in Magneto-gravitating Plasma. *S. S. Aggarwal and G. L. Kalra*. **280**, 792, 58-D14 (1984)
- AGRAWAL, P. C. E2003 + 225: A 3 $^{\text{h}}$ 42 $^{\text{m}}$ AM Hercules Type Binary System. *J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal*. **277**, 682, 19-E7 (1984)
- A'HEARN, M. F. Temporal and Spatial Behavior of the Ultraviolet Emissions of Comet Iras-Araki-Alcock 1983d. *P. D. Feldman, M. F. A'Hearn, and R. L. Millis*. **282**, 799, 83-F14 (1984)
- A'HEARN, MICHAEL F. Infrared Photometry of Comet Bowell and Other Comets. *Michael F. A'Hearn, Eliahu Dwek, and Alan T. Tokunaga*. **282**, 803, 83-G4 (1984)
- Comet 1983d: A Contrast between Data from IRAS and Data from the Ground. *Michael F. A'Hearn and Robert L. Millis*. **282**, L43, 78-D2 (1984)
- AIKAWA, TOSHIKI. Stellar Acoustics. II. Pulse Resonance in Giant Star Models. *Toshiki Aikawa and Charles A. Whitney*. **282**, 527, 80-G9 (1984)
- AIZENMAN, MORRIS L. Rotational Mode Splitting about an Inclined Axis. *Morris L. Aizenman, Carl J. Hansen, John P. Cox, and W. Dean Pesnell*. **286**, L43, 132-D13 (1984)
- AKABANE, K. The H51 α Emission Associated with the Shocked Gas in Orion-KL. *T. Hasegawa and K. Akabane*. **287**, L91, 145-E14 (1984)
- AKABANE, KENJI. CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane*. **283**, 117, 87-C10 (1984)
- AKIN, VICTOR E. Reevaluation of the Rate Constants for the Reactions C $^+$ + H $_2$ \rightarrow CH $^+$ + H and CH $^+$ + H \rightarrow C $^+$ + H $_2$ at Temperatures Characteristic of Ambient and Shocked Diffuse Interstellar Clouds. *Walter J. Chesnavich, Victor E. Akin, and Douglas A. Webb*. **287**, 676, 141-F3 (1984)
- ALBERT, C. E. On Absorption by Hot Interstellar Gas. II. [Fe xiv] λ 5303. *L. M. Hobbs and C. E. Albert*. **281**, 639, 69-E3 (1984)
- ALCAINO, GONZALO. On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. *Roberto Buonanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaino, and William Liller*. **277**, 220, 13-C12 (1984)
- BVRI Main-Sequence Photometry of the Globular Cluster M4. *Gonzalo Alcaino and William Liller*. **56**, 19, 22-B5 (1984) (Abstr. in **283**, 905, 96-F12)
- ALIGHIERI, S. DI SEREGO. [O III] Emission Surrounding the Quasar MR 2251-178. *S. di Serego Alighieri, M. A. C. Perryman, and F. Macchetto*. **285**, 567, 117-F10 (1984)
- ALISSANDRAKIS, C. E. Interpretation of Microwave Active Region Structures Using SMM Soft X-Ray Observations. *K. T. Strong, C. E. Alissandrakis, and M. R. Kundu*. **277**, 865, 21-E4 (1984)
- ALLAMANDOLA, L. J. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor,*

- Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult. **276**, 533, 7-D4 (1984)
- Absorption Features in the 5-8 Micron Spectra of Protostars. A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn. **287**, 697, 142-A1 (1984)
- ALLAN, P. M. Bent Jets in High-Redshift Galaxies. P. M. Allan. **276**, L31, 10-E4 (1984)
- ALLEN, A. J. On Galaxy Interactions during Violent Relaxation of Clusters. A. J. Allen and S. Yabushita. **278**, 468, 31-B2 (1984)
- ALLEN, MARK. Photochemistry of the Atmosphere of Titan: Comparison between Model and Observations. Yuk L. Yung, Mark Allen, and Joseph P. Pinto. **55**, 465, 17-C3 (1984) (Abstr. in **281**, 892, 72-C5)
- ALLER, H. D. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- Multifrequency Spectral Behavior of the BL Lacertae Objects OI 90.4 and 3C 66A. D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinosa, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller. **286**, 711, 131-G11 (1984)
- ALLER, LAWRENCE H. Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes. **280**, 615, 56-E7 (1984)
- Rapid Intensity Variability in the Jets of SS 433. Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes. **281**, 313, 64-C13 (1984)
- ALLER, M. F. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- Multifrequency Spectral Behavior of the BL Lacertae Objects OI 90.4 and 3C 66A. D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinosa, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller. **286**, 711, 131-G11 (1984)
- ALLOIN, DANIELLE M. The Infrared Ca II Triplet: A Luminosity Indicator for Stellar Population Synthesis. Janet E. Jones, Danielle M. Alloin, and Bernard J. T. Jones. **283**, 457, 91-A11 (1984)
- ALPAR, M. A. Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **276**, 325, 4-C13 (1984)
- Vortex Creep and the Internal Temperature of Neutron Stars. II. Vela Pulsar. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **278**, 791, 34-E5 (1984)
- Rapid Postglitch Spin-up of the Superfluid Core in Pulsars. M. A. Alpar, Stephen A. Langer, and J. A. Sauls. **282**, 533, 81-A1 (1984)
- ALTAMORE, A. IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung. **283**, 226, 88-D13 (1984)
- ALTSCHULER, DANIEL R. The Spectral Evolution of Low-Frequency Variable Radio Sources. Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon. **281**, L55, 73-A4 (1984)
- ALY, J. J. On Some Properties of Force-free Magnetic Fields in Infinite Regions of Space. J. J. Aly. **283**, 349, 89-G1 (1984)
- AMBRUSTER, C. Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambruster, W. A. Snyder, and K. S. Wood. **284**, 270, 101-A5 (1984)
- AMEEN, MUDHAFFER M. Line Identifications in the Ultraviolet (2590-3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton. **283**, 760, 95-C2 (1984)
- AN, CHANG-HYUK. MHD Stability of Compressible Coronal Loops with Radiative Energy Loss. Chang-Hyuk An. **276**, 352, 4-E12 (1984)
- Condensation Modes in Magnetized Cylindrical Plasmas. Chang-Hyuk An. **276**, 755, 9-F9 (1984)
- Comments on the MHD Stability of Coronal Plasmas with Line-Tying. Chang-Hyuk An. **281**, 419, 65-D11 (1984)
- The Effect of Line-Tying on the Radiative MHD Stability of Coronal Plasmas with Radial Pressure Profile. Chang-Hyuk An. **284**, 422, 102-E3 (1984)
- ANDERSEN, JOHANNES. On the Existence of a Dark Halo around the High-Velocity Compact Object near NGC 1199. Merle F. Walker and Johannes Andersen. **287**, 148, 134-E5 (1984)
- ANDERSON, P. W. Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **276**, 325, 4-C13 (1984)
- Vortex Creep and the Internal Temperature of Neutron Stars. II. Vela Pulsar. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **278**, 791, 34-E5 (1984)
- ANDERSON, SCOTT F. Rapid Intensity Variability in the Jets of SS 433. Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes. **281**, 313, 64-C13 (1984)
- ANGEL, J. R. P. The Radio Morphology of Blazars and Relationships to Optical Polarization and to Normal Radio Galaxies. J. F. C. Wardle, Richard L. Moore, and J. R. P. Angel. **279**, 93, 38-A9 (1984)
- The Optical Polarization Properties of "Normal" Quasars. H. S. Stockman, Richard L. Moore, and J. R. P. Angel. **279**, 485, 43-B11 (1984)
- ANGERHOFER, P. E. Rapid Radio Variations in the Flux Density of BL Lacertae. K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Jostes, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis. **277**, L30, 22-D11 (1984)
- ANICICH, V. G. The Chemistry of Phosphorus in Dense Interstellar Clouds. L. R. Thorne, V. G. Anicich, S. S. Prasad, and W. T. Huntress, Jr. **280**, 139, 50-E3 (1984)
- ANITA, H. M. Convection in the Envelopes of Red Giants. H. M. Anita, S. M. Chitre, and D. Narasimha. **282**, 574, 81-C14 (1984)
- ANTIOCHOS, S. K. A Dynamic Model for the Solar Transition Region. S. K. Antiochos. **280**, 416, 53-D12 (1984)
- ANTONUCCI, E. The Energetics of Chromospheric Evaporation in Solar Flares. E. Antonucci, A. H. Gabriel, and B. R. Dennis. **287**, 917, 144-C4 (1984)
- ANTONUCCI, ROBERT R. J. Optical Spectropolarimetry of Radio Galaxies. Robert R. J. Antonucci. **278**, 499, 31-D6 (1984)
- A Statistical Study of the Properties of Radio Galaxies. Robert R. J. Antonucci. **281**, 112, 62-B9 (1984)
- APJ STAFF. The Astrophysical Journal Instructions to Authors. APJ Staff. **276**, 1, 5-B11 (1984)
- APPARAO, KRISHNA M. V. Self-Absorption of High-Energy Gamma-Rays in Cygnus X-3. Krishna M. V. Apparao. **287**, 338, 136-E14 (1984)
- APPENZELLER, I. Brightness Variations Caused by Surface Magnetic Fields in Pre-Main-Sequence Stars. I. Appenzeller and D. S. P. Dearborn. **278**, 689, 33-D10 (1984)
- APPLEGATE, JAMES H. Analytical Models of Neutron Star Envelopes. Lars Hernquist and James H. Applegate. **287**, 244, 135-E8 (1984)
- ARENS, JOHN F. High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio. **279**, 685, 45-C12 (1984)
- ARION, D. N. On the Energetics of Slow Magnetic Tearing. D. N. Arion. **277**, 841, 21-C8 (1984)
- ARMENTROUT, P. B. Carbon and Oxygen Isotope Fractionation in Dense Interstellar Clouds. William D. Langer, T. E. Graedel, Margaret A. Frerking, and P. B. Armentrout. **277**, 581, 18-D4 (1984)
- ARMSTRONG, J. THOMAS. HNCO in Molecular Clouds. James M. Jackson, J. Thomas Armstrong, and Alan H. Barrett. **280**, 608, 56-D13 (1984)
- ARNETT, W. D. Cosmological Consequences of Population III Stars. B. J.

- Carr, J. R. Bond, and W. D. Arnett. **277**, 445, 17-A5 (1984)
 The Evolution and Fate of Very Massive Objects. J. R. Bond, W. D. Arnett, and B. J. Carr. **280**, 825, 58-G5 (1984)
- ARP, HALTON. A Large Quasar Inhomogeneity on the Sky. *Halton Arp*. **277**, L27, 22-D8 (1984)
 Two Newly Discovered Quasars Closely Spaced across a Galaxy. *Halton Arp*. **283**, 59, 86-F3 (1984)
 Complete Quasar Search in the NGC 1097 Field. *Halton Arp*, R. D. Wolstencroft, and X. T. He. **285**, 44, 110-D7 (1984)
 Nineteen Newly Discovered Quasars in the Declination -35° Zone. I. *Halton Arp*. **285**, 547, 117-D10 (1984)
 Properties of the Quasars in the Sculptor Region. II. *Halton Arp*. **285**, 555, 117-E12 (1984)
- ARQUILLA, RICHARD. The Molecular Cloud Associated with the Infrared Source GL 437. *Richard Arquilla and Paul F. Goldsmith*. **279**, 664, 45-B5 (1984)
- ATAKAN, A. K. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. S. J. Daunt, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault. **280**, 921, 59-G9 (1984)
- ATHAY, R. G. The Origin of Spicules and Heating of the Lower Transition Region. R. G. Athay. **287**, 412, 137-D6 (1984)
- ATWOOD, BRUCE. The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 - 65. R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips. **286**, 464, 128-B10 (1984)
- AUER, L. H. The Energy Relation between Hard X-Ray and O V Emission in Solar Flares. A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer. **280**, 457, 53-G11 (1984)
- AUMANN, H. H. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- Observations of Comet IRAS-Araki-Alcock 1983d. R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer. **278**, L11, 29-C14 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- EVERY, L. W. The Detection of Interstellar Methylcyanoacetylene. N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarson. **276**, L25, 5-F14 (1984)
 The Detection of Interstellar Methylidiacetylene ($\text{CH}_3\text{C}_3\text{H}$). J. M. MacLeod, L. W. Avery, and N. W. Broten. **282**, L89, 85-D5 (1984)
- AVNI, Y. A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- AVRETT, E. H. Chromospheres and Mass Loss in Metal-deficient Giant Stars. A. K. Dupree, L. Hartmann, and E. H. Avrett. **281**, L37, 66-G7 (1984)
 On the Extended Chromosphere of α Orionis. L. Hartmann and E. H. Avrett. **284**, 238, 100-F1 (1984)
- AYRES, T. R. High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres. **283**, 731, 95-A1 (1984)
- AYRES, THOMAS R. Sigma Geminorum (K1 III + ?): Variability of the Ultraviolet Lines near Conjunction. Thomas R. Ayres, Theodore Simon, and Jeffrey L. Linsky. **279**, 197, 39-B8 (1984)
 The Many Faces of Capella: A Search for Rotational Modulations and a Study of Systematic Velocities of Emission Lines in the Ultraviolet. Thomas R. Ayres. **284**, 784, 107-E7 (1984)
- AZUMA, Y. Laboratory Measurements of the Millimeter-Wave Spectrum of Magnesium Monoxide. T. C. Steinle, Y. Azuma, and P. G. Carrick. **277**, L21, 16-B6 (1984)
- BAAN, WILLEM A. The Peculiar Galaxy IC 4553: VLA-A Observations of the OH Megamaser. Willem A. Baan and Aubrey D. Haschick. **279**, 541, 43-F12 (1984)
- BAAS, F. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult. **276**, 533, 7-D4 (1984)
- BAATH, L. High-Resolution Observations of the Steep Spectrum Source 2147 + 145. W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Baath, and J. Ramey. **277**, L41, 22-E6 (1984)
- BAATH, L. B. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Baath. **279**, 116, 38-C3 (1984)
- BAATH, LARS B. The Sub-Millarcsecond Radio Structure of AO 0235 + 164. Dayton L. Jones, Lars B. Baath, Michael M. Davis, and Stephen C. Unwin. **284**, 60, 98-E9 (1984)
- BACKMAN, D. E. Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga. **284**, 799, 107-F8 (1984)
- BACKMAN, DANA E. The Epsilon Aurigae Secondary: A Binary Embedded within a Disk? Jack J. Lissauer and Dana E. Backman. **286**, L39, 132-D10 (1984)
- BADHWAR, G. D. A Measurement of the Absolute Flux of Cosmic-Ray Electrons. R. L. Golden, B. G. Mauger, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse. **287**, 622, 141-A6 (1984)
- BAHCALL, JOHN N. The Distribution of Stars Perpendicular to a Galactic Disk. John N. Bahcall. **276**, 156, 2-E9 (1984)
 Self-consistent Determinations of the Total Amount of Matter near the Sun. John N. Bahcall. **276**, 169, 2-F8 (1984)
 Detection of Binaries with Projected Separations as Large as 0.1 Parsec. David W. Latham, John Tonry, John N. Bahcall, Raymond M. Soneira, and Paul Schechter. **281**, L41, 66-G10 (1984)
 Velocity Dispersions of Disk Stars in Spiral Galaxies. John N. Bahcall and Stefano Casertano. **284**, L35, 109-B5 (1984)
- K Giants and the Total Amount of Matter near the Sun. John N. Bahcall. **287**, 926, 144-C13 (1984)
- Comparisons of a Standard Galaxy Model with Stellar Observations in Five Fields. John N. Bahcall and Raymond M. Soneira. **55**, 67, 11-E12 (1984) (Abstr. in **279**, 910, 47-G1)
- BAHCALL, NETA A. A Supercluster Catalog. Neta A. Bahcall and Raymond M. Soneira. **277**, 27, 11-C4 (1984)
- X-Ray Emission from Stephan's Quintet and Other Compact Groups. Neta A. Bahcall, D. E. Harris, and Herbert J. Rood. **284**, L29, 109-A12 (1984)
- BAILEY, JEREMY. The Inner Core of a Bok Globule. Terry Jay Jones, A. R. Hyland, and Jeremy Bailey. **282**, 675, 82-D5 (1984)
- BAITY, W. A. Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. W. A. Baity, R. F. Mushotzky, M. W. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primi. **279**, 555, 44-A1 (1984)
- The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primi, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)

- BALACHNADRAN, SUCHITRA. PG 1654 + 160: A New Pulsating DB White Dwarf. *D. E. Winget, E. L. Robinson, R. E. Nather, and Suchitra Balachnadrán*. **279**, L15, 42-E2 (1984)
- BALBUS, STEVEN A. The Propagation and Stability of Time-dependent Galactodetonation Waves. *Steven A. Balbus*. **277**, 550, 18-A14 (1984)
- BALDWIN, J. A. The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 - 65. *R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips*. **286**, 464, 128-B10 (1984)
- BALDWIN, JACK A. Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. *E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin*. **276**, 403, 6-A5 (1984)
- BALICK, BRUCE. The Kinematics of Giant Extragalactic H II Regions. *Evan D. Skillman and Bruce Balick*. **280**, 580, 56-B11 (1984)
- BALIUNAS, S. L. Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. *R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan*. **279**, 763, 46-B8 (1984)
- A Study of the Dependence of Mg II Emission on the Rotational Periods of Main-Sequence Stars. *L. Hartmann, S. L. Baliunas, D. K. Duncan, and R. W. Noyes*. **279**, 778, 46-C10 (1984)
- Ultraviolet Flare on Lambda Andromedae. *S. L. Baliunas, E. F. Guinan, and A. K. Dupree*. **282**, 733, 83-B1 (1984)
- Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. *R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow*. **285**, L23, 114-G8 (1984)
- BALIUNAS, SALLIE L. Ultraviolet and Visible Flare Observations of EQ Pegasi B. *Sallie L. Baliunas and John C. Raymond*. **282**, 728, 83-A10 (1984)
- BALL, R. High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. *S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley*. **286**, 471, 128-C3 (1984)
- BALLY, J. Formaldehyde in the Orion Molecular Flow: Evidence for a Gentle Acceleration. *Alwyn Wootten, Robert B. Loren, and J. Bally*. **277**, 189, 13-A9 (1984)
- BALONEK, T. J. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- BALONEK, THOMAS J. The 20 Year Spectral Evolution of the Radio Nucleus of NGC 1275. *Christopher P. O'Dea, William A. Dent, and Thomas J. Balonek*. **278**, 89, 25-A5 (1984)
- BALTRUSAITIS, R. Limits on Astrophysical ν_e Flux at $E_\nu > 10^{19}$ eV. *R. Baltrusaitis, R. Cady, G. Cassiday, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck*. **281**, L9, 65-E10 (1984)
- BAND, D. The Central X-Ray Source in SS 433. *J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall*. **277**, 286, 14-A13 (1984)
- BAND, DAVID L. On the Origin of X-Ray Variability of SS 433. *David L. Band and Jonathan E. Grindlay*. **285**, 702, 119-B11 (1984)
- BANDIERA, R. The Evolution of Nonthermal Supernova Remnants. II. Can Radio Supernovae Become Plerions? *R. Bandiera, F. Pacini, and M. Salvati*. **285**, 134, 111-D6 (1984)
- BANIA, T. M. The 8.7 GHz Hyperfine Line of $^3\text{He}^+$ in Galactic H II Regions. *Robert T. Rood, T. M. Bania, and T. L. Wilson*. **280**, 629, 56-F7 (1984)
- A Survey of the Latitude Structure of Galactic H I on Small Angular Scales. *T. M. Bania and Felix J. Lockman*. **54**, 513, 8-F9 (1984) (Abstr. in **278**, 895, 35-E13)
- BARAT, C. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt*. **280**, 150, 50-E14 (1984)
- On the Morphology and Spectra of the Short Gamma-Ray Bursts. *C. Barat, R. I. Hayles, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zenchenko*. **285**, 791, 120-B3 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilievsky, and C. Motch*. **286**, L5, 126-D7 (1984)
- Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolizce*. **286**, L11, 126-D14 (1984)
- Three Precise Gamma-Ray Burst Source Locations. *T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer*. **286**, L15, 126-F3 (1984)
- BARATTA, G. B. IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. *R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung*. **283**, 226, 88-D13 (1984)
- BARGE, P. Importance of Transverse Diffusion for Cosmic-Ray Propagation. *P. Barge, J. Millet, and R. Pellat*. **284**, 817, 108-A1 (1984)
- BARKER, E. S. Abundance of Interstellar Aluminum. *E. S. Barker, P. M. Lugger, E. J. Weiler, and D. G. York*. **280**, 600, 56-D5 (1984)
- BARKER, TIMOTHY. Chemical Abundances in a New Halo Planetary Nebula. *Timothy Barker and Kyle M. Cudworth*. **278**, 610, 32-E8 (1984)
- The Ionization Structure of Planetary Nebulae. IV. NGC 6853. *Timothy Barker*. **284**, 589, 105-E2 (1984)
- BARNES, A. Shock Acceleration of Nuclei and Electrons in the Heliosphere beyond 24 AU. *K. R. Pyle, J. A. Simpson, A. Barnes, and J. D. Mihalov*. **282**, L107, 85-E9 (1984)
- BARNES, AARON. Rapid Expansion of Polytropes. *Aaron Barnes and Alan Paul Boss*. **280**, 819, 58-F13 (1984)
- The Far Reaches of the Solar Wind: Pioneer 10 and Pioneer 11 Plasma Results. *Susan E. Kayser, Aaron Barnes, and John D. Mihalov*. **285**, 339, 113-E13 (1984)
- BARNES, THOMAS G., III. Observational Studies of Cepheids. II. BVRI Photometry of 112 Cepheids. *Thomas J. Moffett and Thomas G. Barnes III*. **55**, 389, 16-B10 (1984) (Abstr. in **281**, 890, 72-C3)
- BARRETT, ALAN H. HNC in Molecular Clouds. *James M. Jackson, J. Thomas Armstrong, and Alan H. Barrett*. **280**, 608, 56-D13 (1984)
- BARRETT, P. E. Polarized Radiation from Hot Plasmas and Applications to AM Herculis Binaries. II. Effect of Collisions and Thomson Scattering. *P. E. Barrett and G. Channugam*. **278**, 298, 27-C2 (1984)
- BARRY, DON C. The Time Dependence of Chromospheric Decay for Solar Type Stars. *Don C. Barry, Keith Hege, and Richard H. Cromwell*. **277**, L65, 22-G2 (1984)
- Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. *Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenliid*. **281**, 766, 70-G8 (1984)
- BARTEL, N. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. *N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth*. **279**, 116, 38-C3 (1984)
- BARTEL, NORBERT. The Compact Radio Source 2021 + 614: A Peculiar Narrow-Line Radio Galaxy. *Norbert Bartel, Irwin I. Shapiro, John P. Huchra, and Helmut Kühr*. **279**, 112, 38-B13 (1984)
- BARTOE, J.-D. F. HRTS II EUV Observations of a Solar Ephemeral Region. *Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner*. **278**, 428, 28-E9 (1984)
- High-Resolution Telescope and Spectrograph Observations of the Quiet Solar Chromosphere and Transition Zone. *K. P. Dere, J.-D. F. Bartoe, and G. E. Brueckner*. **281**, 870, 72-A6 (1984)
- BARVAINIS, RICHARD. The Polarization of the SiO Masers in Orion: Maser Emission from a Rotating, Expanding Disk? *Richard Barvainis*. **279**, 358, 40-B11 (1984)
- Time Variability of the 87 GHz Linear Polarization and Flux Density of Active Extragalactic Objects. *Richard Barvainis and C. Read Predmore*. **282**, 402, 79-D6 (1984)
- BASART, JOHN P. Radio Jets in Classical Double Radio Sources with Strong Cores. *Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia*. **283**, 515, 92-D12 (1984)
- BASH, FRANK. Can the Ballistic Particle Model Explain the Hubble Sequence? *David Leisawitz and Frank Bash*. **285**, 25, 110-C2 (1984)
- BASINSKA, E. M. X-Ray Observations of the Burst Source MXB 1728 - 34. *E. M. Basinska, W. H. G. Lewin, M. Sztajno, L. R. Cominsky, and F. J. Marshall*. **281**, 337, 64-E9 (1984)
- BASINSKA, EWA M. Precursors to X-Ray Bursts: The Result of Expansion and Subsequent Contraction of the Neutron Star's Photosphere. *Walter H. G. Lewin, William D. Vacca, and Ewa M. Basinska*. **277**, L57, 22-F8 (1984)
- BASRI, GIBOR. The Chromospheric Hypothesis for the T Tauri Phenomenon. *Nuria Calvet, Gibor Basri, and Leonard V. Kuhi*. **277**, 725, 20-A11 (1984)
- BATCHELOR, DAVID A. Decimetric Gyrosynchrotron Emission during a Solar Flare. *David A. Batchelor, Arnold O. Benz, and Herbert J. Wiehl*. **280**, 879, 59-D3 (1984)
- BATTY, MICHAEL J. Redshifts of Southern Radio Sources. VI. *David L. Jauncey, Michael J. Batty, Alan E. Wright, Bruce A. Peterson, and Ann Savage*. **286**, 498, 128-E8 (1984)
- BAUD, B. The Infrared Astronomical Satellite (IRAS) Mission. *G.*

- Neugebauer, F. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- IRAS Spectra of Planetary Nebulae. S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Hcbing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius. **278**, L33, 29-E7 (1984)
- IRAS Observations of OH/IR Stars. F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch. **278**, L41, 29-E13 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46-47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- Infrared Emission from M31. H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer. **278**, L59, 30-A1 (1984)
- BAZZANO, A. Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda. **279**, 515, 43-D13 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda. **284**, 54, 98-E3 (1984)
- BEALL, J. H. Infrared Emission from Accretion Disks: Detectability and Variability. J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke. **284**, 745, 107-B9 (1984)
- BEALL, JAMES H. The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. William K. Rose, John Guillory, James H. Beall, and Selig Kainer. **280**, 550, 55-G8 (1984)
- BEAUDET, G. The Lithium Abundance: Constraints on Stellar Evolution. G. Michaud, G. Fontaine, and G. Baudet. **282**, 206, 76-B10 (1984)
- BECHTOLD, JILL. Splitting of C IV Lines in a QSO Absorption-Line System. D. G. York, Richard F. Green, Jill Bechtold, and Frederic H. Chaffee, Jr. **280**, L1, 54-C2 (1984)
- IUE Observations of High-Redshift Quasars. Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman. **281**, 76, 61-F12 (1984)
- BECK, S. C. Observations of Infrared Hydrogen Recombination Line Emission from External Galaxies. S. C. Beck, S. Beckwith, and Ian Gatley. **279**, 563, 44-A9 (1984)
- The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. S. Beckwith, S. C. Beck, and I. Gatley. **280**, 648, 57-A1 (1984)
- The Structure of High-Velocity Gas in Orion and the Possible Role of IRc9. S. C. Beck. **281**, 205, 63-B9 (1984)
- BECKER, R. H. New Radio Observations of the Composite Supernova Remnant G29.7 - 0.3. R. H. Becker and D. J. Helfand. **283**, 154, 87-F9 (1984)
- BECKER, ROBERT H. X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. John J. Nugent, Steven H. Pralgo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler. **284**, 612, 105-F13 (1984)
- BECKLIN, E. E. The Massive Core of W51. D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand. **279**, L51, 48-B8 (1984)
- Infrared Observations of the 3C 273 Jets. J. Patrick Henry, E. E. Becklin, and C. M. Telesco. **280**, 98, 50-B1 (1984)
- The Kleinmann-Low Nebula: An Infrared Cavity. C. G. Wynn-Williams, R. Genzel, E. E. Becklin, and D. Downes. **281**, 172, 62-F14 (1984)
- Observations of the Brightness Profile of the Sun in the 30-200 Micron Continuum. C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley. **281**, 862, 71-G11 (1984)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper. **282**, 427, 79-G4 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin. **284**, 118, 99-D1 (1984)
- Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga. **284**, 799, 107-F8 (1984)
- The Location of Infrared Sources in the Galactic Center from a Deep 1 Micron CCD Image. J. P. Henry, D. L. DePoy, and E. E. Becklin. **285**, L27, 114-G12 (1984)
- Submillimeter Continuum Observations of M82. D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand. **285**, L31, 115-A2 (1984)
- BECKWITH, S. Ionized Magnesium in the Planetary Nebula NGC 7027. S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant. **277**, 207, 13-B13 (1984)
- Observations of Infrared Hydrogen Recombination Line Emission from External Galaxies. S. C. Beck, S. Beckwith, and Ian Gatley. **279**, 563, 44-A9 (1984)
- The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. S. Beckwith, S. C. Beck, and I. Gatley. **280**, 648, 57-A1 (1984)
- Limits on the Infrared and Visual Luminosity of the Intergalactic H I Cloud in Leo. M. F. Skrutskie, M. A. Shure, and S. Beckwith. **227**, L65, 85-B13 (1984)
- Discovery of Solar System-Size Halos around Young Stars. S. Beckwith, B. Zuckerman, M. F. Skrutskie, and H. M. Dyck. **287**, 793, 143-A2 (1984)
- Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith. **287**, 801, 143-A10 (1984)
- BEER, H. The s-Process Branching at ¹⁵¹Sm. H. Beer, F. Käppeler, K. Yokoi, and K. Takahashi. **278**, 388, 28-B11 (1984)
- BEERS, TIMOTHY C. Seven Poor Clusters of Galaxies. Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis. **283**, 33, 86-D3 (1984)
- BEICHMAN, C. A. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46-47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)

- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- BEINTEMA, D. A. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- IRAS Spectra of Planetary Nebulae. S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius. **278**, L33, 29-E7 (1984)
- IRAS Observations of Two Early-Type Pre-Main-Sequence Stars in the Association Chamaeleon I. P. R. Wesselius, D. A. Beintema, and F. M. Olmon. **278**, L37, 29-E10 (1984)
- IRAS Spectra near Young Objects with Bipolar Outflows: L1551 and HH 46-47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- BEKENSTEIN, JACOB. Does the Missing Mass Problem Signal the Breakdown of Newtonian Gravity? *Jacob Bekenstein and Mordehai Milgrom*. **286**, 7, 122-A11 (1984)
- BELL, R. A. Spectroscopy over a Range of 5 Magnitudes in NGC 6752. R. A. Bell, James E. Hesser, and R. D. Cannon. **283**, 615, 93-F3 (1984)
- BEISERENE, E. Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Balunas, E. Beiserene, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)
- BELTRAN-LOPEZ, VIRGILIO. The Direct Measurement of the $3^3P_0-3^3P_1$ Fine-Structure Interval and the g -Factor of Atomic Silicon by Laser Magnetic Resonance. Massimo Inguscio, K. M. Evenson, Virgilio Beltran-Lopez, and Eugenio Ley-Koo. **278**, L127, 36-D9 (1984)
- BELY-DUBAU, F. Analysis of Magnesium XI Line Profiles from Solar Active Regions. R. L. Blake, R. D. Cowan, H. Felthaus, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark. **282**, 784, 83-E13 (1984)
- BENASSI, M. A High-Order Spherical Harmonics Solution to the Standard Problem in Radiative Transfer. M. Benassi, R. D. M. Garcia, A. H. Karp, and C. E. Stewert. **280**, 853, 59-B5 (1984)
- BENFORD, GREGORY. Magnetically Ordered Jets from Pulsars. *Gregory Benford*. **282**, 154, 75-E13 (1984)
- BENNETT, C. L. 5 Gigahertz Structure and Optical Identifications of Weak Extragalactic Radio Sources. C. R. Lawrence, C. L. Bennett, J. N. Hewitt, and B. F. Burke. **278**, L95, 36-A12 (1984)
- 5 GHz Source Variability and the Gain of the NRAO 300 Foot Telescope. C. L. Bennett, C. R. Lawrence, and B. F. Burke. **54**, 21, 4-E5 (1984) (Abstr. in **276**, 798, 10-B10)
- BENSON, J. M. Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. J. M. Benson and K. J. Johnston. **277**, 181, 13-A1 (1984)
- BENSON, P. J. Dense Cores in Dark Clouds: Young Embedded Stars at 2 Micrometers. P. J. Benson, P. C. Myers, and E. L. Wright. **279**, L27, 42-E13 (1984)
- BENTLEY, A. F. An Infrared Spatial Study of the Planetary Nebula BD + 30°3639. A. F. Bentley, J. A. Hackwell, G. L. Grasdale, and R. D. Gehrz. **278**, 665, 33-B14 (1984)
- BENVENUTI, P. IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti. **278**, 124, 25-D2 (1984)
- BENVENUTI, PIERO. Radiative Shock-Wave Theory. I. Chemical Abundance Diagnostics and Galactic Abundance Gradients. *Michael A. Dopita, Luc Binette, Sandro D'Odorico, and Piero Benvenuti*. **276**, 653, 8-F2 (1984)
- BENZ, A. O. On Coronal Oscillations. B. Roberts, P. M. Edwin, and A. O. Benz. **279**, 857, 47-B12 (1984)
- BENZ, ARNOLD O. Decimetric Gyrosynchrotron Emission during a Solar Flare. David A. Batchelor, Arnold O. Benz, and Herbert J. Wiehl. **280**, 879, 59-D3 (1984)
- BERGE, G. L. High-Resolution Maps of the 1.5 GHz Emission from Jupiter's Disk and Radiation Belt. J. A. Roberts, G. L. Berge, and R. C. Bignell. **282**, 345, 77-E10 (1984)
- Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- BERTOUD, CLAUDE. An Efficient Method for Computing Spectral Line Profiles in Stellar Envelopes. *Claude Bertout*. **285**, 269, 112-G6 (1984)
- BERTRAM, TIMOTHY. On the Half-Life of ^{180}Ta in Stellar Environments. Eric B. Norman, Stephen E. Kellogg, Timothy Bertram, Salvador Gil, and Peter Wong. **281**, 360, 64-G8 (1984)
- BESSELL, M. S. The Ultra-Metal-deficient (Population III?) Red Giant CD -38°245. M. S. Bessell and John Norris. **285**, 622, 118-C11 (1984)
- BETZ, A. L. Silane in IRC +10216. D. M. Goldhaber and A. L. Betz. **279**, L55, 48-B12 (1984)
- BEUERMANN, K. VV Puppis: The Soft X-Ray Machine. *Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White*. **279**, 785, 46-D3 (1984)
- The Detection of X-Rays from Nova Muscae 1983 with the EXOSAT Satellite. H. Ogelman, K. Beuermann, and J. Krautter. **287**, L31, 138-E4 (1984)
- BEZARD, B. The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager Iris Spectra: NH_3 , PH_3 , C_2H_2 , C_2H_6 , CH_3D , CH_4 , and the Saturnian D/H Isotopic Ratio. R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel. **287**, 899, 144-A14 (1984)
- BHATIA, A. K. On Bowen Enhancement of the N III Spectrum under Solar and Nebulae Conditions. S. O. Kastner and A. K. Bhatia. **287**, 945, 144-E4 (1984)
- BICKNELL, G. V. Optical Properties of the Knots in NGC 7385. S. M. Simkin, G. V. Bicknell, and A. Bosma. **277**, 513, 17-F3 (1984)
- Infrared Mapping of the M87 Jet. N. E. B. Killeen, G. V. Bicknell, A. R. Hyland, and T. J. Jones. **280**, 126, 50-D3 (1984)
- A Model for the Surface Brightness of a Turbulent Low Mach Number Jet. I. Theoretical Development and Application to 3C 31. G. V. Bicknell. **286**, 68, 122-F2 (1984)
- BIEGING, J. H. The Detection of Variable, Nonthermal Radio Emission from Two O Type Stars. David C. Abbott, J. H. Bieging, and E. Churchwell. **280**, 671, 57-B10 (1984)
- VLA Observations of T Tauri Stars. II. A Luminosity-limited Survey of Taurus-Auriga. J. H. Bieging, Martin Cohen, and P. R. Schwartz. **282**, 699, 82-F4 (1984)
- The Distribution of HCN in the Circumstellar Envelope of IRC +10216. J. H. Bieging, B. Chapman, and W. J. Welch. **285**, 656, 118-F3 (1984)
- The Molecular Disk in S106. J. H. Bieging. **286**, 591, 129-E13 (1984)
- BIENTENHOLZ, MICHAEL F. Is There Really Evidence for Universal Rotation? *Michael F. Bientenholz and Philipp K. Kronberg*. **287**, L1, 138-C3 (1984)
- BIERMANN, P. The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus. **280**, 542, 55-F13 (1984)
- BIGNAMI, G. On the Nature of the Galactic Gamma-Ray Sources. G. E. Morfill, M. Forman, and G. Bignami. **284**, 856, 108-D2 (1984)
- BIGNAMI, GIOVANNI F. An Identification for "Gemina" (2CG 195 + 04): The Optical Counterpart of 1E 0630 + 178, A Unique Object in the Gamma-Ray Source Error Box. Patrizia A. Caraveo, Giovanni F. Bignami, Laurent Vigroux, and Jacques A. Paul. **276**, L45, 10-F2 (1984)
- BIGNELL, R. C. Radio Structure of the Proto-Planetary Nebula GL 618. Sun Kwok and R. C. Bignell. **276**, 544, 7-E1 (1984)

- The Radio Structure of HM Sagittae. *Sun Kwok, R. C. Bignell, and C. R. Purton*. **279**, 188, 39-A12 (1984)
- High-Resolution Maps of the 1.5 GHz Emission from Jupiter's Disk and Radiation Belt. *J. A. Roberts, G. L. Berge, and R. C. Bignell*. **282**, 345, 77-E10 (1984)
- BINETTE, LUC. Radiative Shock-Wave Theory. I. Chemical Abundance Diagnostics and Galactic Abundance Gradients. *Michael A. Dopita, Luc Binette, Sandro D'Odorico, and Piero Benvenuti*. **276**, 653, 8-F2 (1984)
- Radiative Shock Wave Theory. III. The Nature of the Optical Emission in Young Supernova Remnants. *Michael A. Dopita, Luc Binette, and Ian R. Tuohy*. **282**, 142, 75-D14 (1984)
- BIRKINSHAW, MARK. Hot Spots in Cygnus A at 89 GHz. *Melvin Wright and Mark Birkinshaw*. **281**, 135, 62-D4 (1984)
- BIRNBAUM, GEORGE. Hydrogen Dimer Structures in the Far-Infrared Spectra of Jupiter and Saturn. *Lothar Frommhold, Robert Samuelson, and George Birnbaum*. **283**, L79, 97-D14 (1984)
- BJÖRNSSON, CLAES-INGVAR. A New Look at Pulsar Polarization. *Claes-Ingvar Björnsson*. **277**, 367, 14-G10 (1984)
- BLACK, JOHN H. Interstellar O₂. I. Abundance, Excitation, and Prospects for Detection of ¹⁶O¹⁸O at Radio Frequencies. *John H. Black and Peter L. Smith*. **277**, 562, 18-B12 (1984)
- Interstellar O₂. II. VUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. *Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman*. **277**, 569, 18-C5 (1984)
- Interstellar Absorption Lines in the Infrared Spectrum of NGC 2024 IRS 2. *John H. Black and S. P. Willner*. **279**, 673, 45-B14 (1984)
- BLADES, J. C. Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. *D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu*. **276**, 92, 2-A1 (1984)
- BLAHA, C. IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti*. **278**, 124, 25-D2 (1984)
- BLAIR, WILLIAM P. IUE Observations of Centaurus X-4 during the 1979 May Outburst. *William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank*. **278**, 270, 27-A1 (1984)
- Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. *William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull*. **279**, 708, 45-E7 (1984)
- An Optical Investigation of the Peculiar Supernova Remnant CTB 80. *William P. Blair, Robert P. Kirshner, Robert A. Fesen, and Theodore R. Gull*. **282**, 161, 75-F6 (1984)
- BLAKE, GEOFFREY A. On the Interpretation of the Broad-Band Millimeter-Wave Flux from Orion. *E. C. Sutton, Geoffrey A. Blake, C. R. Masson, and T. G. Phillips*. **283**, L41, 97-B4 (1984)
- ¹³CH₃OH in OMC-1. *Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia*. **286**, 586, 129-E8 (1984)
- The Millimeter and Submillimeter Laboratory Spectrum of Methyl Formate in its Ground Symmetric Torsional State. *Grant M. Plummer, Eric Herbst, Frank C. De Lucia, and Geoffrey A. Blake*. **55**, 633, 20-C10 (1984) (Abstr. in **282**, 821, 84-A11)
- BLAKE, J. B. On the Composition of the Stellar Winds of the Most Massive Stars: 100 M_⊙ to 2200 M_⊙. *D. S. P. Dearborn and J. B. Blake*. **277**, 783, 20-F3 (1984)
- BLAKE, R. L. Analysis of Magnesium XI Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthausen, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark*. **282**, 784, 83-E13 (1984)
- BLOSS, W. E. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. *S. J. Daunt, A. K. Atakan, W. E. Bloss, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault*. **280**, 921, 59-G9 (1984)
- BLEACH, R. D. The HEAO A-1 X-Ray Source Catalog. *K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidav*. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- BLINT, R. J. Quantal Calculations of Charge Transfer in Collisions between N v and Atomic Hydrogen. *C. A. Feickert, R. J. Blint, G. T. Surratt, and W. D. Watson*. **286**, 371, 126-A1 (1984)
- BLITZ, L. The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. *J. B. G. M. Bloemen, L. Blitz, and W. Hermesen*. **279**, 136, 38-D9 (1984)
- The Detectability of Population III "Jupiters". *H. Karimabadi and L. Blitz*. **283**, 169, 87-G11 (1984)
- BLITZ, LEO. Optical H II Regions in the Outer Galaxy. *Michel Fich and Leo Blitz*. **279**, 125, 38-C12 (1984)
- High-Latitude Molecular Clouds. *Leo Blitz, Loris Magnani, and Lee Mundy*. **282**, L9, 78-A9 (1984)
- BLOEMEN, J. B. G. M. The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. *J. B. G. M. Bloemen, L. Blitz, and W. Hermesen*. **279**, 136, 38-D9 (1984)
- BLOEMHOF, E. E. Diffraction-limited Spatial Resolution of Circumstellar Dust Shells at 10 Microns. *E. E. Bloemhof, C. H. Townes, and A. H. B. Vanderwyck*. **276**, L21, 5-F10 (1984)
- BLUDMAN, S. A. Effect of Initial Thermal Structure on the Collapse and Explosion of Iron Stellar Cores. *I. Lichtenstadt and S. A. Bludman*. **276**, 746, 9-E14 (1984)
- BLUMENTHAL, G. R. On the Overstability of Axisymmetric Oscillations in Thin Accretion Disks. *G. R. Blumenthal, L. T. Yang, and D. N. C. Lin*. **287**, 774, 142-F11 (1984)
- BOBROFF, NORMAN. XUV Observations of Capella and the Local Interstellar Medium. *Norman Bobroff, John Nousek, and Gordon Garmire*. **277**, 678, 19-E3 (1984)
- BOCLET, D. Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. *J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes*. **279**, 177, 39-A1 (1984)
- BODENHEIMER, PETER. Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. *Peter Bodenheimer and Ronald E. Taam*. **280**, 771, 58-C7 (1984)
- BOESGAARD, ANN MERCHANT. Rotational Modulation of the Chromospheric Activity in χ^1 Orionis (G0 V). *Ann Merchant Boesgaard and Theodore Simon*. **277**, 241, 13-E5 (1984)
- BOGDAN, T. J. Propagation of Axisymmetric Disturbances on a Twisted Magnetic Flux Tube. *T. J. Bogdan*. **282**, 769, 83-D10 (1984)
- BOGESS, N. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olnon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. *M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker*. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. *M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker*. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius*. **278**, L19, 29-D8 (1984)
- IRAS Images of the Galactic Center. *T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden*. **278**, L57, 29-G4 (1984)
- Infrared Emission from M31. *H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer*. **278**, L59, 30-A1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. *B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young*. **278**, L71, 30-C5 (1984)
- BOGGS, DON. The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. *Erika Böhm-Vitense, Paul Hodge, and Don Boggs*. **287**, 825, 143-C7 (1984)
- BOHLIN, R. C. The Variation of Galactic Interstellar Extinction in the Ultraviolet. *A. N. Witt, R. C. Bohlin, and T. P. Stecher*. **279**, 698, 45-D11 (1984)
- BOHLIN, RALPH C. Images in the Rocket Ultraviolet: Photometry of M101. *Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher*. **277**, 542, 18-A5 (1984)
- BOHM, K. H. The Ultraviolet Spectrum of a Strongly Reddened, High-Excitation Herbig-Haro Object. *K. H. Böhm and E. Böhm-Vitense*. **277**, 216, 13-C8 (1984)
- The Reflection Nebula NGC 1999. *Jason A. Cardelli and K. H. Böhm*. **285**, 613, 118-C2 (1984)
- BOHM-VITENSE, E. The Ultraviolet Spectrum of a Strongly Reddened, High-Excitation Herbig-Haro Object. *K. H. Böhm and E. Böhm-Vitense*. **277**, 216, 13-C8 (1984)
- BOHM-VITENSE, ERIKA. The Problem of the Barium Stars. *Erika Böhm-Vitense, James Nemec, and Charles Proffitt*. **278**, 726, 33-G6 (1984)
- The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. *Erika Böhm-Vitense, Paul Hodge, and Don Boggs*.

- 287, 825, 143-C7 (1984)
- BOHN, H. U. The Overshoot Region at the Bottom of the Solar Convection Zone. *J. H. M. M. Schmitt, R. Rosner, and H. U. Bohn.* **282**, 316, 77-C9 (1984)
- BOKSBERG, A. NGC 4650A: The Rotation of the Diffuse Stellar Component. *Paul L. Schechter, Marie-Helene Ulrich, and A. Boksenberg.* **277**, 526, 17-G3 (1984)
- Extended Gaseous Emission in Normal Elliptical Galaxies. *M.-H. Demoulin-Ulrich, H. R. Butcher, and A. Boksenberg.* **285**, 527, 117-C4 (1984)
- BOLDT, E. A. On the X-Ray Spectrum of the Volume Emissivity Arising from Abell Clusters. *A. R. Stottlmyer and E. A. Boldt.* **279**, 511, 43-D9 (1984)
- BOLDT, ELIHU. Optical Characteristics of Young Quasars as Sources of the Cosmic X-Ray Background. *Elihu Boldt and Darryl Leiter.* **276**, 427, 6-C2 (1984)
- BOLTON, C. T. A Search for Periods Longer than 5.6 Days in the Optical Spectrum of HDE 226868 = Cygnus X-1. *D. R. Gies and C. T. Bolton.* **276**, L17, 5-F7 (1984)
- BOND, H. E. E2003 + 225: A $3^d 4^{th}$ AM Herculis Type Binary System. *J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal.* **277**, 682, 19-E7 (1984)
- WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? *M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne.* **282**, 763, 83-D4 (1984)
- BOND, HOWARD E. The Pulsating Central Star of the Planetary Nebula Kohoutek 1-16. *Albert D. Grauer and Howard E. Bond.* **277**, 211, 13-C3 (1984)
- HD 46703: A High-Luminosity Population II F-Type Star. *R. Earle Luck and Howard E. Bond.* **279**, 729, 45-G2 (1984)
- Two New Extremely Hot Pulsating White Dwarfs. *Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert.* **279**, 751, 46-A10 (1984)
- BOND, J. R. Cosmological Consequences of Population III Stars. *B. J. Carr, J. R. Bond, and W. D. Arnett.* **277**, 445, 17-A5 (1984)
- The Evolution and Fate of Very Massive Objects. *J. R. Bond, W. D. Arnett, and B. J. Carr.* **280**, 825, 58-G5 (1984)
- Cosmic Background Radiation Anisotropies in Universes Dominated by Nonbaryonic Dark Matter. *J. R. Bond and G. Efstathiou.* **285**, L45, 121-C13 (1984)
- BONNET, R. M. On the Origin of the Discrete Character of the Solar Disk Brightness in the 160 Nanometer Continuum. *B. Foing and R. M. Bonnet.* **279**, 848, 47-B2 (1984)
- BONNET BIDAUD, J. M. Coordinated UV and Optical Observations of the AM Herculis Object EI405 - 451 in the High and Low States. *L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips.* **285**, 214, 112-C6 (1984)
- BONOMETTI, R. J. The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney.* **287**, 538, 140-A11 (1984)
- BONOMETTO, S. A. Physical Processes in the Universe at the Epoch of the Quark-Hadron Transition. *S. A. Bonometto and M. Sakellariadou.* **282**, 372, 79-A14 (1984)
- BOONE, J. Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. *J. Boone, R. Cady, G. L. Cassiday, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech.* **285**, 264, 112-G1 (1984)
- BOPP, BERNARD W. The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley.* **285**, 202, 112-B8 (1984)
- Ca II Emission Surface Fluxes in Active Chromosphere Stars. *Bernard W. Bopp.* **54**, 387, 7-A14 (1984) (Abstr. in **277**, 907, 22-A8)
- BORD, DONALD J. An Analysis by Wavelength Coincidence Statistics of the Ultraviolet Spectrum of Kappa Cancri. *George T. Chionacki, Charles R. Cowley, and Donald J. Bord.* **286**, 736, 131-B11 (1984)
- BORDERIES, NICOLE. Excitation of Inclinations in Ring-Satellite Systems. *Nicole Borderies, Peter Goldreich, and Scott Tremaine.* **284**, 429, 102-E10 (1984)
- BORIAKOFF, VALENTIN. Pulsar Polarization Fluctuations. I. 1404 MHz Statistical Summaries. *Daniel R. Stinebring, J. M. Cordes, Joanna M. Rankin, J. M. Weisberg, and Valentin Boriakoff.* **55**, 247, 14-D9 (1984) (Abstr. in **280**, 939, 60-B3)
- Pulsar Polarization Fluctuations. II. 800 MHz Statistical Summaries. *Daniel R. Stinebring, J. M. Cordes, J. M. Weisberg, Joanna M. Rankin, and Valentin Boriakoff.* **55**, 279, 14-G7 (1984) (Abstr. in **280**, 939, 60-B3)
- BORIS, JAY P. Detailed Studies of the Dynamics and Energetics of Coronal Bullets. *Judith T. Karpen, Elaine S. Oran, and Jay P. Boris.* **287**, 396, 137-C4 (1984)
- BORNE, KIRK D. Interacting Binary Galaxies. I. A Numerical Model and Preliminary Results. *Kirk D. Borne.* **287**, 503, 139-F2 (1984)
- BOROSON, TODD A. Spectroscopy of the Nebulosity around Eight High-Luminosity QSOs. *Todd A. Boroson and J. B. Oke.* **281**, 535, 68-D5 (1984)
- New Spectrophotometry of the Extremely Cool Proper Motion Star LHS 2924. *James Liebert, Todd A. Boroson, and Mark S. Giampapa.* **282**, 758, 83-C13 (1984)
- BOROVSKY, JOSEPH E. The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. *Joseph E. Borovsky, Morris B. Pongratz, Robert A. Roussel-Dupre, and Tai-Ho Tan.* **280**, 802, 58-E10 (1984)
- BORRA, ERMANNO F. A Search for Faint Highly Polarized Objects. *Ermanno F. Borra and Gilles Corvieveau.* **276**, 449, 6-D11 (1984)
- The Magnetic Fields of the Late-Type Stars. *Ermanno F. Borra, Geoffrey Edward, and M. Mayor.* **284**, 211, 100-D2 (1984)
- BOSMA, A. Optical Properties of the Knots in NGC 7385. *S. M. Simkin, G. V. Bicknell, and A. Bosma.* **277**, 513, 17-F3 (1984)
- BOSS, ALAN PAUL. Protostellar Formation in Rotating Interstellar Clouds. IV. Nonisothermal Collapse. *Alan Paul Boss.* **277**, 768, 20-E2 (1984)
- Rapid Expansion of Polytropes. *Aaron Barnes and Alan Paul Boss.* **280**, 819, 58-F13 (1984)
- BOTHUN, GREGORY D. Searching for the Optimal Means of Comparative H I Analysis. *Gregory D. Bothun.* **277**, 532, 17-G9 (1984)
- The Distances and Properties of a Sample of Sc I Galaxies. *Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould.* **278**, 475, 31-B9 (1984)
- Infrared Photometry and Optical Spectroscopy of Dwarf Galaxies in the Virgo Cluster. *Gregory D. Bothun and C. Nelson Caldwell.* **280**, 528, 55-E13 (1984)
- BOTTINELLI, L. The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. *L. Bottinelli, L. Gouguenheim, G. Paturel, and G. de Vaucouleurs.* **280**, 34, 49-C14 (1984)
- BOUCHACOURT, P. A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognos 7) Satellite Experiment. *P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky.* **285**, L67, 121-E10 (1984)
- BOUGHN, S. P. Limits on a Stochastic Gravitational Wave Background from Observations of Terrestrial and Solar Oscillations. *S. P. Boughn and J. R. Kuhn.* **286**, 387, 127-C9 (1984)
- BOWERS, P. F. The Three-dimensional Structure of a Circumstellar Maser. *P. F. Bowers and Mark Morris.* **276**, 646, 8-E9 (1984)
- VLA Observations of 1612 and 1667 MHz OH Masers Associated with IRC + 10420. *P. F. Bowers.* **279**, 350, 40-G3 (1984)
- Luminosities and Mass-Loss Rates of OH/H₂O Maser Stars. *P. F. Bowers and Wendy Hagen.* **285**, 637, 118-E12 (1984)
- BOWYER, STUART. Optical Observations of the BL Lacertae Object 2155 - 304 and Implications regarding the X-Ray Absorption Feature at 600-700 eV. *Stuart Bowyer, Jean Brodie, John T. Clarke, and J. Patrick Henry.* **278**, L103, 36-B7 (1984)
- The Evolution of the Optical Spectrum of the Dwarf Nova SS Cygni over One Complete Outburst Cycle. *John T. Clarke, Debbie Capel, and Stuart Bowyer.* **287**, 845, 143-D14 (1984)
- BOYD, R. N. On the Thermonuclear Origin of the Gamma-Rays from SS 433. *R. N. Boyd, M. Wiescher, G. H. Newsom, and G. W. Collins II.* **276**, L9, 5-E9 (1984)
- BOYER, D. W. Oscillating Dynamo Magnetic Field in the Presence of an External Nondynamo Field. The Influence of a Solar Primordial Field. *D. W. Boyer and E. H. Levy.* **277**, 848, 21-D1 (1984)
- BOYNTON, P. E. New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yentis.* **283**, L53, 97-C2 (1984)
- BRACCESI, A. A Complete Sample of Quasars at $B = 19.80$. *H. L. Marshall, Y. Arai, A. Braccisi, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zucchi.* **283**, 50, 86-E7 (1984)
- BRADT, HALE V. An Intercontinental Baseline Coincidence Search for Optical Flashes with Two Schmidt Telescopes. *Bradley E. Schaefer, Roland Vanderspek, Hale V. Bradt, and George R. Ricker.* **283**, 887, 96-E8 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov.* **286**, L1, 126-D2 (1984)
- BRAGG, S. L. The $v = 0 \rightarrow 0$ Spectrum of H₂. *D. E. Jennings, S. L. Bragg, and J. W. Brault.* **282**, L85, 85-D2 (1984)
- BRADT, J. W. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. *S. J. Daut, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault.* **280**, 921, 59-G9 (1984)

- The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. *A. J. Sauval, N. Grevesse, J. W. Brault, G. M. Stokes, and R. Zander.* **282**, 330, 77-D9 (1984)
- The $v = 0 \rightarrow 0$ Spectrum of H_2 . *D. E. Jennings, S. L. Bragg, and J. W. Brault.* **282**, L85, 85-D2 (1984)
- BRAULT, JAMES W. Oscillator Strengths of the C_2 $A^1\Pi - X^1\Sigma^+$ Phillips System. *Sumner P. Davis, Wm. Hayden Smith, James W. Brault, Rubén Pecnyer, and Jeremy Wagner.* **287**, 455, 137-G7 (1984)
- BRAUN, A. On the Mechanism of Decelerating the Gas Infalling onto Magnetized Neutron Stars. *A. Braun and R. Z. Yahel.* **278**, 349, 27-F13 (1984)
- BRAY, R. J. High-Resolution Photography of the Solar Chromosphere. XIX. Flow Velocities along an Active Region Loop. *R. E. Loughhead and R. J. Bray.* **283**, 392, 90-C7 (1984)
- BRECHER, KENNETH. Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the HEAO 3 Gamma-Ray Spectrometer. *Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson.* **281**, 566, 68-F8 (1984)
- BREGMAN, J. Absorption Features in the 5–8 Micron Spectra of Protostars. *A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn.* **287**, 697, 142-A1 (1984)
- BREGMAN, J. D. The Unusual 8–13 Micron Spectrum of Markarian 231. *J. D. Bregman and F. C. Witteborn.* **281**, L17, 65-F3 (1984)
- BREGMAN, J. N. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan.* **276**, 454, 6-E2 (1984)
- BREGMAN, JOEL N. X-Ray Observations of Broad Absorption-Line Quasars. *Joel N. Bregman.* **276**, 423, 6-B12 (1984)
- BRIDGES, TERRY J. Theoretical Zero-Age Main Sequences Applied to the Pleiades, Praesepe, and Hyades Star Clusters. *Don A. Vandenberg and Terry J. Bridges.* **278**, 679, 33-C14 (1984)
- BRIDLE, A. H. High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis.* **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)
- BRIGGS, F. H. The Broad Absorption Lines in the Spectrum of the QSO PKS 1157 + 014: A Possible Link between Broad Absorption Line QSOs, Metal Enrichment, and the Formation of Galaxies. *F. H. Briggs, D. A. Turnshek, and A. M. Wolfe.* **287**, 549, 140-B8 (1984)
- BRIOTTA, D. A., JR. Abundances in Galactic H II Regions. III. G25.4 – 0.2, G45.5 + 0.06, M8, S159, and DR 22. *J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones.* **285**, 174, 111-G5 (1984)
- BRODERICK, J. J. The Spectral Evolution of Low-Frequency Variable Radio Sources. *Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon.* **281**, L55, 73-A4 (1984)
- BRODIE, JEAN. Optical Observations of the BL Lacertae Object 2155 – 304 and Implications regarding the X-Ray Absorption Feature at 600–700 eV. *Stuart Bowyer, Jean Brodie, John T. Clarke, and J. Patrick Henry.* **278**, L103, 36-B7 (1984)
- A Galaxy Cluster behind M87. *John Huchra and Jean Brodie.* **280**, 547, 55-G4 (1984)
- BROMAGE, G. E. The Correlation of Interstellar Element Depletions with Mean Gas Density. *A. W. Harris, C. Gry, and G. E. Bromage.* **284**, 157, 99-G1 (1984)
- BROTEN, N. W. The Detection of Interstellar Methylcyanoacetylene. *N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarsen.* **276**, L25, 5-F14 (1984)
- The Detection of Interstellar Methylidyne (CH). *J. M. MacLeod, L. W. Avery, and N. W. Broten.* **282**, L89, 85-D5 (1984)
- BROWN, A. High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib–II): Transition Region Structure and Energy Balance. *A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres.* **283**, 731, 95-A1 (1984)
- The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. *S. A. Drake, A. Brown, and J. L. Linsky.* **284**, 774, 107-D10 (1984)
- BROWN, ALEXANDER. The Temperature of C II Emission-Line Formation Regions in Cool Stars. *Alexander Brown and Kenneth G. Carpenter.* **287**, L43, 138-F1 (1984)
- BROWN, J. M. Infrared and Far-Infrared Transition Frequencies for the CH_3 Radical. *Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown.* **276**, 399, 5-B7 (1984)
- BROWN, JEFFREY A. Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. *David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson.* **284**, 223, 100-D14 (1984)
- BROWN, P. J. F. The Nitrogen-deficient Cluster NGC 6231. *F. P. Keenan, P. J. F. Brown, P. L. Dufton, and D. J. Lennon.* **279**, L11, 42-D12 (1984)
- BROWN, TIMOTHY M. Techniques for Detecting Giant Cells Using Spatially Resolved Solar Velocity Data. *Timothy M. Brown and Peter A. Gilman.* **286**, 804, 131-G9 (1984)
- BRUECKNER, G. E. HRTS II EUV Observations of a Solar Ephemeral Region. *Robert Roussel-Duprè, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner.* **278**, 428, 28-E9 (1984)
- High-Resolution Telescope and Spectrograph Observations of the Quiet Solar Chromosphere and Transition Zone. *K. P. Dere, J.-D. F. Bartoe, and G. E. Brueckner.* **281**, 870, 72-A6 (1984)
- BRUGEL, EDWARD R. Jets from Young Stars: The Case of R Monocerotis. *Edward R. Brugel, Reinhard Mundt, and Thomas Bührke.* **287**, L73, 145-D10 (1984)
- BRUHWEILER, F. C. Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock.* **278**, 521, 31-E14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Córdoba, and K. O. Mason.* **284**, 512, 104-F8 (1984)
- Multifrequency Spectral Behavior of the BL Lacertae Objects OI 90.4 and 3C 66A. *D. M. Worrall, J. J. Puschell, J. M. Rodríguez-Espinosa, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller.* **286**, 711, 131-G11 (1984)
- BRUNING, DAVID H. Magnetic Field Observations of Evolved Stars. *Geoffrey W. Marcy and David H. Bruning.* **281**, 286, 64-A12 (1984)
- The Applicability of the Fourier Convolution Theorem to the Analysis of Late-Type Stellar Spectra. *David H. Bruning.* **281**, 830, 71-E7 (1984)
- BUCHLER, J. ROBERT. Amplitude Equations for Nonadiabatic Nonlinear Stellar Pulsators. I. The Formalism. *J. Robert Buchler and Marie-Jo Goupil.* **279**, 384, 41-C5 (1984)
- Critique of the Iterative Theory of Stellar Pulsations. *J. Robert Buchler and W. Dean Pesnell.* **283**, 316, 89-D10 (1984)
- BUHRKE, THOMAS. Jets from Young Stars: The Case of R Monocerotis. *Edward R. Brugel, Reinhard Mundt, and Thomas Bührke.* **287**, L73, 145-D10 (1984)
- BUJARRABAL, V. On the Excitation of CH Microwave Lines. *V. Bujarrabal, I. Gonzalo, and F. Salinas.* **285**, 312, 113-C10 (1984)
- Thermal and Maser Molecular Lines from the Envelope of IRC + 10216. *Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner.* **286**, 276, 125-A1 (1984)
- BUNKER, P. R. Infrared and Far-Infrared Transition Frequencies for the CH_3 Radical. *Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown.* **276**, 399, 5-B7 (1984)
- BUONANNO, ROBERTO. On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. *Roberto Buonoanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaíno, and William Liller.* **277**, 220, 13-C12 (1984)
- The Population Structure of the Large Magellanic Cloud Bar. *Eduardo Hardy, Roberto Buonoanno, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer.* **278**, 592, 32-D3 (1984)
- BURKE, B. F. 5 Gigahertz Structure and Optical Identifications of Weak Extragalactic Radio Sources. *C. R. Lawrence, C. L. Bennett, J. N. Hewitt, and B. F. Burke.* **278**, L95, 36-A12 (1984)
- 5 GHz Source Variability and the Gain of the NRAO 300 Foot Telescope. *C. L. Bennett, C. R. Lawrence, and B. F. Burke.* **54**, 211, 4-E5 (1984) (Abstr. in **276**, 798, 10-B10)
- BURKE, WILLIAM L. Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. *E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin.* **276**, 403, 6-A5 (1984)
- BURNHAM, N. An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. *L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan.* **276**, 254, 3-E12 (1984)
- BURNHAM, NEAL. Rotational Velocities of Low-Mass Stars in the Pleiades. *John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham.* **280**, 202, 51-C4 (1984)
- BURNS, J. O. What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen.* **278**, 37, 24-D6 (1984)
- BURNS, JACK O. Radio Jets in Classical Double Radio Sources with Strong Cores. *Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia.* **283**, 515, 92-D12 (1984)
- BURNS, MICHAEL L. Pair Production Rates in Mildly Relativistic, Magnetized Plasmas. *Michael L. Burns and Alice K. Harding.* **285**, 747, 119-F1 (1984)
- BURROWS, ADAM. On Detecting Stellar Collapse with Neutrinos. *Adam Burrows.* **283**, 848, 96-B11 (1984)
- On the Accuracy of the Single-Nucleus Approximation in the Equation of State of Hot, Dense Matter. *Adam Burrows and James M.*

- Lattimer. **285**, 294, 113-B6 (1984)
- BURROWS, D. N. Limits on Soft X-Ray Flux from Distant Emission Regions. *D. N. Burrows, D. McCammon, W. T. Sanders, and W. L. Kraushaar*. **287**, 208, 135-B13 (1984)
- BURSTEIN, DAVID. Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. *David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm*. **287**, 586, 140-E5 (1984)
- Reddening Estimates for Galaxies in the Second Reference Catalog and the Uppsala General Catalog. *David Burstein and Carl Heiles*. **54**, 33, 1-C4 (1984) (Abstr. in **275**, 927, 147-E14)
- BUSSARD, R. W. Nonthermal Synchrotron Radiation in a Strong Magnetic Field. *R. W. Bussard*. **284**, 357, 101-G8 (1984)
- BUTCHER, H. R. Extended Gaseous Emission in Normal Elliptical Galaxies. *M.-H. Demoulin-Ulrich, H. R. Butcher, and A. Boksenberg*. **285**, 527, 117-C4 (1984)
- BUTCHER, HARVEY. Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley*. **277**, 82, 11-G5 (1984)
- The Evolution of Galaxies in Clusters. V. A Study of Populations since $z \sim 0.5$. *Harvey Butcher and Augustus Oemler, Jr.* **285**, 426, 116-B6 (1984)
- BUTI, B. Heat Flux Instability in Cometary and Solar Plasma. *G. S. Lakhina and B. Buti*. **280**, 917, 59-G5 (1984)
- BUTTON, S. A Radio Survey of Symbiotic Stars. *E. R. Seaquist, A. R. Taylor, and S. Button*. **284**, 202, 100-C7 (1984)
- BYARD, PAUL L. Variability of the Emission-Line Spectra and Optical Continua of Seyfert Galaxies. II. *Bradley M. Peterson, Craig B. Foltz, D. Michael Crenshaw, Karie A. Meyers, and Paul L. Byard*. **279**, 529, 43-E13 (1984)
- BYRAM, E. T. Millisecond Variability of Cygnus X-1. *J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman*. **278**, 288, 27-B6 (1984)
- The HEAO A-1 X-Ray Source Catalog. *K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidav*. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- BYRD, GENE G. Gravitational Spurs and Resonances: Effects of Small Mass Disturbances in Spiral Galaxy Disks. *Gene G. Byrd, Bruce F. Smith, and Richard H. Miller*. **286**, 62, 122-E10 (1984)
- CABOT, W. The Nonaxisymmetric Baroclinic Instability in Thin Accretion Disks. *W. Cabot*. **277**, 806, 21-A1 (1984)
- CADY, R. Limits on Astrophysical ν_e Flux at $E_e > 10^{10}$ eV. *R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck*. **281**, L9, 65-E10 (1984)
- Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. *J. Boone, R. Cady, G. L. Cassidy, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech*. **285**, 264, 112-G1 (1984)
- CAHN, JULIUS H. Observational Evolution of the Central Stars of Planetary Nebulae. *Julius H. Cahn*. **279**, 304, 40-C13 (1984)
- CALDWELL, C. NELSON. Infrared Photometry and Optical Spectroscopy of Dwarf Galaxies in the Virgo Cluster. *Gregory D. Bothun and C. Nelson Caldwell*. **280**, 528, 55-E13 (1984)
- CALDWELL, NELSON. Two Early-Type Galaxies with Ionized Gas Disks. *Nelson Caldwell*. **278**, 96, 25-A12 (1984)
- Imaging Spectrophotometric Observations of the Ionized Hydrogen Associated with M82. *T. B. Williams, Nelson Caldwell, and R. A. Schommer*. **281**, 579, 68-G7 (1984)
- CALVET, NURIA. The Chromospheric Hypothesis for the T Tauri Phenomenon. *Nuria Calvet, Gibor Basri, and Leonard V. Kuhi*. **277**, 725, 20-A11 (1984)
- Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. *Jorge Cantó, Luis F. Rodríguez, Nuria Calvet, and Russell M. Leveault*. **282**, 631, 82-A1 (1984)
- CAMERON, A. G. W. On the Formation of Stars from Disk Accretion. *J. A. Mercer-Smith, A. G. W. Cameron, and R. I. Epstein*. **279**, 363, 41-A2 (1984)
- CAMPBELL, B. An Atlas of QSO Luminosity Profiles. *J. B. Hutchings, D. Crampton, B. Campbell, D. Duncan, and B. Glendenning*. **55**, 319, 15-C4 (1984) (Abstr. in **280**, 940, 60-B4)
- CAMPBELL, BEL. Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. *Bel Campbell and Rodger I. Thompson*. **279**, 650, 45-A5 (1984)
- VLA Observations of Collimated Outflow at NGC 7538 IRS 1. *Bel Campbell*. **282**, L27, 78-C2 (1984)
- New Radio Sources at AFGL 2591: Young Cluster or Single Star? *Bel Campbell*. **287**, 334, 136-E10 (1984)
- CAMPBELL, BRUCE. Optical Imaging of 78 Quasars and Host Galaxies. *J. B. Hutchings, D. Crampton, and Bruce Campbell*. **280**, 41, 49-D8 (1984)
- The Lithium Abundance of Hyades Main-Sequence Stars. *Koger Cayrel, Giusa Cayrel de Strobel, Bruce Campbell, and Werner Däppen*. **283**, 205, 88-C5 (1984)
- Color Anomalies and Starspots in Hyades Dwarfs. *Bruce Campbell*. **283**, 209, 88-C9 (1984)
- Spectroscopic Evidence for Starspots in the G Dwarf HD 1835. *Bruce Campbell and Roger Cayrel*. **283**, L17, 91-F5 (1984)
- CAMPBELL, M. F. Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. *S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley*. **279**, 162, 38-F11 (1984)
- Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^\circ 5'$ to $l = 17^\circ 5'$. *M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall*. **283**, 566, 93-A10 (1984)
- CANE, H. V. Type II Solar Radio Bursts, Interplanetary Shocks, and Energetic Particle Events. *H. V. Cane and R. G. Stone*. **282**, 339, 77-E4 (1984)
- CANFIELD, RICHARD C. A Static Model of Chromospheric Heating in Solar Flares: Erratum. *Paul J. Ricchiazzi and Richard C. Canfield*. **279**, 463, 42-A11 (1984) (Orig. paper in **272**, 739, 109-G5)
- Chromospheric Evaporation Velocities in Solar Flares. *George H. Fisher, Richard C. Canfield, and Alexander N. McClymont*. **281**, L79, 73-B13 (1984)
- The Ha Spectral Signatures of Solar Flare Nonthermal Electrons, Conductive Flux, and Coronal Pressure. *Richard C. Canfield, Todd A. Gunkler, and Paul J. Ricchiazzi*. **282**, 296, 77-B3 (1984)
- A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. *Todd A. Gunkler, Richard C. Canfield, Loren W. Acton, and Alan L. Kiplinger*. **285**, 835, 120-E7 (1984)
- CANIZARES, C. R. The Mass Profile and Gas Content of M87. *G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen*. **278**, 536, 31-G1 (1984)
- CANIZARES, CLAUDE R. SAS 3 Observations of Cygnus X-1: The Intensity Dips. *Ronald A. Remillard and Claude R. Canizares*. **278**, 761, 34-C3 (1984)
- A Sharp X-Ray Absorption Feature in the BL Lacertae Object PKS 2155 - 304. *Claude R. Canizares and John Kruper*. **278**, L99, 36-B2 (1984)
- CANNIZZO, J. K. The Vertical Structure and Stability of Alpha Model Accretion Disks. *J. K. Cannizzo and J. C. Wheeler*. **55**, 367, 16-A2 (1984) (Abstr. in **281**, 890, 72-C3)
- CANNON, R. D. Spectroscopy over a Range of 5 Magnitudes in NGC 6752. *R. A. Bell, James E. Hesser, and R. D. Cannon*. **283**, 615, 93-F3 (1984)
- CANTERNA, R. Color-Magnitude Photometry for the Globular Cluster NGC 288. *Edward W. Olzewski, R. Canterna, and William E. Harris*. **281**, 158, 62-E13 (1984)
- CANTÓ, JORGE. Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. *Jorge Cantó, Luis F. Rodríguez, Nuria Calvet, and Russell M. Leveault*. **282**, 631, 82-A1 (1984)
- CANUTO, V. M. Testing the Strong Equivalence Principle by Radio Ranging. *V. M. Canuto, I. Goldman, and I. I. Shapiro*. **276**, 1, 1-A6 (1984)
- A Formula for the Shakura-Sunyaev Turbulent Viscosity Parameter. *V. M. Canuto, I. Goldman, and O. Hubickyj*. **280**, L55, 60-E6 (1984)
- CAPEL, DEBBIE. The Evolution of the Optical Spectrum of the Dwarf Nova SS Cygni over One Complete Outburst Cycle. *John T. Clarke, Debbie Capel, and Stuart Bowyer*. **287**, 845, 143-D14 (1984)
- CAPPALLO, R. J. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. *N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth*. **279**, 116, 38-C3 (1984)
- CAPPS, R. W. High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. *Gary L. Grassdale, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castellet*. **283**, L57, 97-C6 (1984)
- CAPRIOTTI, E. R. Are Forbidden Lines Present in the Optical Spectrum of the QSO 3C 273? *B. M. Peterson, K. A. Meyers, and E. R. Capriotti*. **283**, 529, 92-E12 (1984)
- CARAVEO, PATRIZIA A. An Identification for "Geminga" (2CG 195 + 04): The Optical Counterpart of 1E 0630 + 178, A Unique Object in the Gamma-Ray Source Error Box. *Patrizia A. Caraveo, Giovanni F. Bignami, Laurent Vigroux, and Jacques A. Paul*. **276**, L45, 10-F2 (1984)
- CARBON, DUANE F. An Atlas of Late-Type Stellar Spectra, 2400-2778 Inverse Centimeters. *Stephen T. Ridgway, Duane F. Carbon, Donald N. B. Hall, and Jack Jewell*. **54**, 177, 4-A2 (1984) (Abstr. in **276**, 798, 10-B10)

- CARDELLI, JASON A. The Reflection Nebula NGC 1999. *Jason A. Cardelli and K. H. Böhm*. **285**, 613, 118-C2 (1984)
- CARDONA, OCTAVIO. The Nature of the Visual Companions of Ap and Am Stars. *Helmut A. Abt and Octavio Cardona*. **276**, 266, 3-F10 (1984)
- Be Stars in Binaries. *Helmut A. Abt and Octavio Cardona*. **285**, 190, 112-A10 (1984)
- CARGILL, P. J. Diamagnetic Propulsion and Energy Balance of Magnetic Elements in the Solar Chromosphere and Transition Region. *P. J. Cargill and G. W. Pneuman*. **276**, 369, 4-G1 (1984)
- CARGILL, PETER J. Magnetohydrodynamic Stability of Line-tied Coronal Arcades. II. Shearless Magnetic Fields. *Stefano Migliuolo, Peter J. Cargill, and Alan W. Hood*. **281**, 413, 65-D5 (1984)
- CARLBERG, R. G. Spiral Instabilities Provoked by Accretion and Star Formation. *J. A. Sellwood and R. G. Carlberg*. **282**, 61, 74-E12 (1984)
- Dissipative Formation of an Elliptical Galaxy. *R. G. Carlberg*. **286**, 403, 127-D11 (1984)
- Dissipative Models for the Sequence of Elliptical Galaxies. *R. G. Carlberg*. **286**, 416, 127-E12 (1984)
- CARLETON, N. P. 1-20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward*. **280**, 514, 56-B5 (1984)
- Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga*. **284**, 523, 104-G5 (1984)
- CARLSON, ERIC R. The Molecular Halo of M82. *Antony A. Stark and Eric R. Carlson*. **279**, 122, 38-C9 (1984)
- CARNEVALI, PAOLO. Phase-Space Correlation Functions and Isolating Integrals. *Paolo Carnevali and Paolo Santangelo*. **281**, 473, 65-B2 (1984)
- CARNEY, BRUCE W. The Baade-Wesselink Method and the Distances to RR Lyrae Stars. I. The Field Star VY Serpentis. *Bruce W. Carney and David W. Latham*. **278**, 241, 26-E11 (1984)
- The Blue Stragglers of M67. *Ruth C. Peterson, Bruce W. Carney, and David W. Latham*. **279**, 237, 39-E13 (1984)
- CARPENTER, KENNETH G. Characteristics of the Fe II and C II Emission in High-Resolution IUE Spectra (2300-3000 Å) of Alpha Orionis. *Kenneth G. Carpenter*. **285**, 181, 112-A1 (1984)
- Rotational Velocities of Later B Type and A Type Stars as Determined from Ultraviolet versus Visual Line Profiles. *Kenneth G. Carpenter, Arne Slettebak, and George Sonneborn*. **286**, 741, 131-C2 (1984)
- The Temperature of C II Emission-Line Formation Regions in Cool Stars. *Alexander Brown and Kenneth G. Carpenter*. **287**, L43, 138-F1 (1984)
- CARR, B. J. Cosmological Consequences of Population III Stars. *B. J. Carr, J. R. Bond, and W. D. Arnett*. **277**, 445, 17-A5 (1984)
- The Evolution and Fate of Very Massive Objects. *J. R. Bond, W. D. Arnett, and B. J. Carr*. **280**, 825, 58-G5 (1984)
- CARRICK, P. G. Laboratory Measurements of the Millimeter-Wave Spectrum of Magnesium Monoxide. *T. C. Steimle, Y. Azuma, and P. G. Carrick*. **277**, L21, 16-B6 (1984)
- CARRUTHERS, GEORGE R. The S201 Far-Ultraviolet Imaging Survey. II. A Field in Cygnus. *George R. Carruthers and Thornton Page*. **54**, 271, 5-C2 (1984) (Abstr. in **276**, 799, 10-B11)
- The S201 Far-Ultraviolet Imaging Survey. III. A Field in Sagittarius. *George R. Carruthers and Thornton Page*. **55**, 101, 12-A3 (1984) (Abstr. in **279**, 911, 47-G2)
- CARSENTY, URI. The Kinematics of the Crab Nebula's Jet. *Peter Shull, Jr., Uri Carsty, Michael Sarcander, and Thorsten Neckel*. **285**, L75, 121-F9 (1984)
- CARSON, T. R. Discrepancy in the CNO Opacity Bump Resolved. *T. R. Carson, W. F. Huebner, N. H. Magee, Jr., and A. L. Merts*. **283**, 466, 91-B7 (1984)
- CARSON, T. RICHARD. Long-Period Classical Cepheids: Theory versus Observation. *T. Richard Carson and Richard B. Stothers*. **276**, 593, 8-A11 (1984)
- Very Slow Classical Cepheids: Theoretical Models with Periods Longer than 50 Days. *T. Richard Carson and Richard B. Stothers*. **281**, 811, 71-D1 (1984)
- CARSWELL, R. F. Observations of Three QSOs with Complex, Broad Absorption Lines. *D. A. Turnshek, R. J. Weymann, R. F. Carswell, and M. G. Smith*. **277**, 51, 11-E1 (1984)
- The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 - 65. *R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips*. **286**, 464, 128-B10 (1984)
- CARSWELL, ROBERT F. The Absorption Line Profiles in Q1101-264. *Robert F. Carswell, Donald C. Morton, Malcolm G. Smith, Alan N. Stockton, David A. Turnshek, and Ray J. Weymann*. **278**, 486, 36-C6 (1984)
- CASERTANO, STEFANO. Velocity Dispersions of Disk Stars in Spiral Galaxies. *John N. Bahcall and Stefano Casertano*. **284**, L35, 109-B5 (1984)
- CASH, W. C. Line Profile Variation in δ Orionis A, ϵ Orionis A, and 15 Monocerotis. *C. A. Grady, T. P. Snow, and W. C. Cash*. **283**, 218, 88-D4 (1984)
- CASH, WEBSTER, JR. Einstein Observations of X-Ray Emission from A Stars: Erratum. *L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr.* **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- CASSAR, L. Star Formation in the M8E Region. *M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders*. **278**, 170, 25-G8 (1984)
- Velocity-resolved Infrared Spectroscopy of LkHa 101. *M. Simon and L. Cassar*. **283**, 179, 88-A7 (1984)
- CASSELLA, A. IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. *R. Viotti, A. Altamore, G. B. Baratta, A. Cassella, and M. Friedjung*. **283**, 226, 83-D13 (1984)
- CASSEN, PATRICK. The Collapse of the Cores of Slowly Rotating Isothermal Clouds. *Susan Terebey, Frank H. Shu, and Patrick Cassen*. **286**, 529, 129-A5 (1984)
- CASSIDAY, G. Limits on Astrophysical ν_e Flux at $E_\nu > 10^{19}$ eV. *R. Baltrusaitis, R. Cady, G. Cassiday, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck*. **281**, L9, 65-E10 (1984)
- CASSIDAY, G. L. Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. *J. Boone, R. Cady, G. L. Cassiday, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech*. **285**, 264, 112-G1 (1984)
- CASSINELLI, JOSEPH P. Properties of R136a as Derived from Its Optical Light Distribution. *You-Hua Chu, Joseph P. Cassinelli, and Mark G. Wolfire*. **283**, 560, 93-A4 (1984)
- Main-Sequence B Stars with Strong Winds in the Core of NGC 6231. *Derck Massa, Blair D. Savage, and Joseph P. Cassinelli*. **287**, 814, 143-B9 (1984)
- CASTAÑEDA, HECTOR O. [O II] Studies of Galactic Planetary Nebulae and Extragalactic H II Complexes. *C. R. O'Dell and Hector O. Castañeda*. **283**, 158, 87-F14 (1984)
- CASTELAZ, MICHAEL. High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. *Gary L. Grasdale, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castela*. **283**, L57, 97-C6 (1984)
- CASTOR, JOHN I. Spectral Variability in Early-Type Binary X-Ray Systems. *Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson*. **282**, 245, 76-E7 (1984)
- CAYREL, ROGER. The Lithium Abundance of Hyades Main-Sequence Stars. *Roger Cayrel, Giulia Cayrel de Strobel, Bruce Campbell, and Werner Däppen*. **283**, 205, 88-C5 (1984)
- Spectroscopic Evidence for Starspots in the G Dwarf HD 1835. *Bruce Campbell and Roger Cayrel*. **283**, L17, 91-F5 (1984)
- CAYREL DE STROBEL, GIULIA. The Lithium Abundance of Hyades Main-Sequence Stars. *Roger Cayrel, Giulia Cayrel de Strobel, Bruce Campbell, and Werner Däppen*. **283**, 205, 88-C5 (1984)
- CECIL, GERALD. Spatially Resolved High-Velocity Outflow from the Nucleus of M51. *Gerald Cecil and James A. Rose*. **287**, 131, 134-D2 (1984)
- CENTRELLA, JOAN. Planar Numerical Cosmology. II. The Difference Equations and Numerical Tests. *Joan Centrella and James R. Wilson*. **54**, 229, 4-F8 (1984) (Abstr. in **276**, 798, 10-B10)
- CHAFFEE, FREDERIC H., JR. Splitting of C IV Lines in a QSO Absorption-Line System. *D. G. York, Richard F. Green, Jill Bechtold, and Frederic H. Chaffee, Jr.* **280**, L1, 54-C2 (1984)
- Improved Lower Limits on Lyman-Alpha Forest Cloud Dimensions and Additional Evidence Supporting the Gravitational Lens Nature of 2345 + 007A. *B. Craig B. Foltz, Ray J. Weymann, Hermann-Josef Röser, and Frederic H. Chaffee, Jr.* **281**, L1, 65-E2 (1984)
- CHAMBON, G. A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognost 7) Satellite Experiment. *P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky*. **285**, L67, 121-E10 (1984)
- CHAN, KWING L. Turbulent Compressible Convection in a Deep Atmosphere. II. Two-Dimensional Results for Main-Sequence A5 and F0 Type Envelopes. *Sabatino Sofia and Kwing L. Chan*. **282**, 550, 81-B4 (1984)
- CHANAN, GARY A. The Underlying Galaxies of X-Ray-Selected Quasars. *Matthew A. Malkan, Bruce Margon, and Gary A. Chanan*. **280**, 66, 49-F7 (1984)
- Polarization Evidence for the Isotropy of Electrons Responsible for the Production of 5-20 keV X-Rays in Solar Flares. *Leonard J. Tramiel, Gary A. Chanan, and R. Novick*. **280**, 440, 53-F8 (1984)
- On the X-Ray Emission from Crab-like Supernova Remnants. *Stephen P. Reynolds and Gary A. Chanan*. **281**, 673, 69-G10 (1984)
- The Radial X-Ray Brightness Profile of the Coma Cluster. *Gary A. Chanan and Frank Abramopoulos*. **287**, 89, 134-A1 (1984)
- An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 - 693

- in the Large Magellanic Cloud. Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds. **287**, L23, 138-D9 (1984)
- CHANG, KAR MAN. Stellar Orbits in Angle Variables. Stephen J. Ratcliff, Kar Man Chang, and M. Schwarzschild. **279**, 610, 44-D14 (1984)
- CHANMUGAM, G. Polarized Radiation from Hot Plasmas and Applications to AM Herculis Binaries. II. Effect of Collisions and Thomson Scattering. P. E. Barrett and G. Chanmugam. **278**, 298, 27-C2 (1984)
- The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. G. Chanmugam and A. Ray. **285**, 252, 112-F3 (1984)
- CHAPMAN, B. The Distribution of HCN in the Circumstellar Envelope of IRC + 10216. J. H. Bieging, B. Chapman, and W. J. Welch. **285**, 656, 118-F3 (1984)
- CHAPMAN, G. A. Solar Luminosity Fluctuations and Active Region Photometry. G. A. Chapman, A. D. Herzog, J. K. Lawrence, and J. C. Shelton. **282**, L99, 85-E2 (1984)
- CHAPMAN, ROBERT D. The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- CHARLAND, Y. Diffusion-induced Hydrogen Burning in Helium-rich White Dwarfs. G. Michaud, G. Fontaine, and Y. Charland. **280**, 247, 51-F8 (1984)
- CHARLES, P. A. Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles. **286**, 196, 124-B2 (1984)
- CHAU, W. Y. Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. W. Y. Chau, Kayll Lake, and J. Stone. **281**, 560, 68-F2 (1984)
- CHELLI, A. The Sub-Arc Second Structure of IRC2 at 5 Microns. A. Chelli, C. Perrier, and P. Lena. **280**, 163, 50-F14 (1984)
- CHENG, CHUNG-CHIEH. Correlated Observations of Impulsive UV and Hard X-Ray Bursts in Solar Flares from the Solar Maximum Mission. Chung-Chieh Cheng, Einar Tandberg-Hanssen, and L. E. Orwig. **278**, 853, 35-B11 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek. **286**, 787, 131-F6 (1984)
- CHEREPASHCHUK, A. M. Ultraviolet Photometry from the Orbiting Astronomical Observatory XXXIX. The Structure of the Eclipsing Wolf-Rayet Binary V444 Cygni as Derived from Light Curves between 2460 Å and 3.5 Microns. A. M. Cherepashchuk, Joel A. Eaton, and Kh. F. Khaliliulin. **281**, 774, 71-A4 (1984)
- CHESNAVICH, WALTER J. Reevaluation of the Rate Constants for the Reactions $C^+ + H_2 \rightarrow CH^+ + H$ and $CH^+ + H \rightarrow C^+ + H_2$ at Temperatures Characteristic of Ambient and Shocked Diffuse Interstellar Clouds. Walter J. Chesnavich, Victor E. Akin, and Douglas A. Webb. **287**, 676, 141-F3 (1984)
- CHESTER, T. J. Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. F. A. Cordova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire. **278**, 739, 34-A9 (1984)
- CHEUNG, L. H. Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^\circ$ to $l = +62^\circ$: Structure and Energetics of the Inner Disk. M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung. **285**, 74, 110-F14 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen. **286**, 573, 129-D9 (1984)
- CHEVALIER, R. A. Evolution of Pulsar-driven Supernova Remnants. S. P. Reynolds and R. A. Chevalier. **278**, 630, 32-G7 (1984)
- CHEVALIER, ROGER A. A Cosmic-Ray Supported Galactic Corona. Roger A. Chevalier and Claes Fransson. **279**, L43, 48-A12 (1984)
- Colliding Winds: Interaction Regions with Strong Heat Conduction. James N. Imamura and Roger A. Chevalier. **280**, 313, 52-D5 (1984)
- Infall in Elliptical Galaxies. Raymond E. White III and Roger A. Chevalier. **280**, 561, 56-A6 (1984)
- The Interaction of Crab-like Supernova Remnants with Their Surroundings. Roger A. Chevalier. **280**, 797, 58-E5 (1984)
- A New Type of Extended Nonthermal Radio Emitter: Detection of the Old Nova GK Persei. Stephen P. Reynolds and Roger A. Chevalier. **281**, L33, 66-G4 (1984)
- The Circumstellar Interaction Model for the Radio Emission from a Type I Supernova. Roger A. Chevalier. **285**, L63, 121-E6 (1984)
- CHIEFFI, ALESSANDRO. On the Evolution of an Intermediate-Mass Zero-Metal Star Which Does Not Experience Thermal Instabilities during the Double Shell Burning Phase. Alessandro Chieffi and Amedeo Tornambè. **287**, 745, 142-D10 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè. **287**, 749, 142-D14 (1984)
- CHIKADA, YOSHIHIRO. CS around Orion-KL: A Large Rotating Disk. Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane. **283**, 117, 87-C10 (1984)
- CHIN, G. Vibrational and Rotational Excitation of CO in Comets: Nonequilibrium Calculations. G. Chin and H. A. Weaver. **285**, 858, 120-G2 (1984)
- CHITRE, S. M. The Quasar Q2345 + 007A, B: A Case for the Double Gravitational Lens? K. Subramanian and S. M. Chitre. **276**, 440, 6-D2 (1984)
- Convection in the Envelopes of Red Giants. H. M. Anita, S. M. Chitre, and D. Narasimha. **282**, 574, 81-C14 (1984)
- Gravitational Lens Models for the Triple Radio Source MG 2016 + 112. D. Narasimha, K. Subramanian, and S. M. Chitre. **283**, 512, 92-D9 (1984)
- Electron Capture Supernovae: One-Zone Collapse Calculation for Stars with Masses $10 M_\odot$ and $15 M_\odot$. A. Ray, S. M. Chitre, and K. Kar. **285**, 766, 119-G6 (1984)
- CHONACKI, GEORGE T. An Analysis by Wavelength Coincidence Statistics of the Ultraviolet Spectrum of Kappa Cancri. George T. Chonacki, Charles R. Cowley, and Donald J. Bord. **286**, 736, 131-B11 (1984)
- CHLEBOWSKI, T. X-Rays from Eta Carinae. T. Chlebowski, F. D. Seward, J. Swank, and A. Szymkowiak. **281**, 665, 69-G1 (1984)
- CHLEBOWSKI, TOMASZ. High-Resolution Soft X-Ray Spectra of Scorpius X-1: The Structure of Circumscribed Accreting Material. Steven M. Kahn, Frederick D. Seward, and Tomasz Chlebowski. **283**, 286, 89-B7 (1984)
- CHOUDHURI, ARNAB RAI. The Effect of Closed Boundary Conditions on a Stationary Dynamo. Arnab Rai Choudhuri. **281**, 846, 71-F9 (1984)
- CHRISTIAN, C. A. Abundance Estimates for the Distant Anticenter Clusters King 8 and Be 19. C. A. Christian. **286**, 552, 129-C1 (1984)
- CHRISTIAN, CAROL A. A Library of Stellar Spectra. George H. Jacoby, Deidre A. Hunter, and Carol A. Christian. **56**, 257, 25-F6 (1984) (Abstr. in **284**, 870, 108-E2)
- CHRISTIANSEN, W. A. The Radio Properties of the Broad Absorption-Line Quasars. J. T. Stocke, C. B. Foltz, R. J. Weymann, and W. A. Christiansen. **280**, 476, 55-B2 (1984)
- CHU, YOU-HUA. Properties of R136a as Derived from Its Optical Light Distribution. You-Hua Chu, Joseph P. Cassinelli, and Mark G. Wolfire. **283**, 560, 93-A4 (1984)
- CHUBB, T. A. Millisecond Variability of Cygnus X-1. J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman. **278**, 288, 27-B6 (1984)
- The HEAO A-1 X-Ray Source Catalog. K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidav. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- CHURCHWELL, E. The Detection of Variable, Nonthermal Radio Emission from Two O Type Stars. David C. Abbott, J. H. Bieging, and E. Churchwell. **280**, 671, 57-B10 (1984)
- The Relative Abundances of Cyanogenated Molecules. E. Churchwell, A. G. Nash, and C. M. Walmsley. **287**, 681, 141-F9 (1984)
- CHURCHWELL, ED. CN in Dark Interstellar Clouds. Richard M. Crutcher, Ed Churchwell, and L. M. Ziurys. **283**, 668, 94-C4 (1984)
- CIARDULLO, ROBIN. Spectrophotometry and Image Analysis of the Nebulosity around the Low-Redshift Quasar 0241 + 622. W. Romanishin, Holland Ford, Robin Ciardullo, and Bruce Margon. **277**, 487, 17-D5 (1984)
- CLARK, CHARLES W. Isotope Shifts of Some Ultraviolet Transitions of First Row Elements. Charles W. Clark. **285**, 322, 113-D6 (1984)
- CLARK, F. O. Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson. **276**, 572, 7-G4 (1984)
- SiO Flux Measurements of Variable Stars. F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson. **283**, 174, 88-A2 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). J. S. Miller, F. O. Clark, and T. H. Troland. **287**, 892, 144-A7 (1984)
- CLARK, FRANK O. The Gas Density Gradient for Three Dark Interstellar Clouds. Stuart A. Fulkerson and Frank O. Clark. **287**, 723, 142-B14 (1984)
- CLARK, GEORGE W. SAS 3 Survey of the Soft X-Ray Background. Frederic J. Marshall and George W. Clark. **287**, 633, 141-B5 (1984)
- CLARK, ROBERT E. H. Inner Shell Excitation of Lithium-like Ions. Stephen J. Goett, Douglas H. Sampson, and Robert E. H. Clark. **54**, 115, 2-E2 (1984) (Abstr. in **275**, 928, 147-F1)
- CLARKE, JOHN T. Optical Observations of the BL Lacertae Object 2155 - 304 and Implications regarding the X-Ray Absorption Feature at 600-700 eV. Stuart Bowyer, Jean Brodie, John T. Clarke, and J. Patrick Henry. **278**, L103, 36-B7 (1984)

- The Evolution of the Optical Spectrum of the Dwarf Nova SS Cygni over One Complete Outburst Cycle. *John T. Clarke, Debbie Capel, and Stuart Bowyer*. **287**, 845, 143-D14 (1984)
- CLAUSSEN, M. J. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. *C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. *M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **285**, L79, 121-G2 (1984)
- CLAUSSEN, MARK J. OH Maser Emission from Warm Variable Stars. *John D. Fix and Mark J. Claussen*. **287**, L35, 138-E8 (1984)
- CLAY, R. W. First Observation of Gamma-Rays from Vela X-1 at Energies Greater than 3×10^{15} eV. *R. J. Protheroe, R. W. Clay, and P. R. Gerhardt*. **280**, L47, 60-D10 (1984)
- CLAYTON, DONALD D. ^{26}Al in the Interstellar Medium. *Donald D. Clayton*. **280**, 144, 50-E8 (1984)
- Galactic Chemical Evolution and Nucleocosmochronology: Standard Model with Terminated Infall. *Donald D. Clayton*. **285**, 411, 116-A5 (1984)
- CLEGG, P. E. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. *M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker*. **278**, L7, 29-C9 (1984)
- Infrared Emission from M31. *H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer*. **278**, L59, 30-A1 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. *J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker*. **278**, L63, 30-A7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. *T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond*. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. *B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young*. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). *E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier*. **278**, L75, 30-C9 (1984)
- A 25 Micron Component in 3C 390.3. *G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young*. **278**, L79, 30-C14 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. *G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson*. **278**, L83, 30-D2 (1984)
- Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radostitz*. **280**, 102, 50-B7 (1984)
- CLEGG, R. E. S. SiS in Circumstellar Shells. *R. Sahai, Abwyn Wootten, and R. E. S. Clegg*. **284**, 144, 99-F2 (1984)
- CLEMENS, D. P. A Search for Interstellar Silicon Nitride. *L. M. Ziurys, D. P. Clemens, R. J. Saykaly, M. Colvin, and H. F. Schaefer*. **281**, 219, 63-C9 (1984)
- The Distribution of CO in the Galaxy for Longitudes 294° to 86° . *B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon*. **283**, L31, 97-A8 (1984)
- CLEMENT, MAURICE J. Normal Modes of Oscillation for Rotating Stars. II. Variational Solutions. *Maurice J. Clement*. **276**, 724, 9-D6 (1984)
- CLINE, T. 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Znenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch*. **286**, L5, 126-D7 (1984)
- CLINE, T. L. The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury*. **278**, 112, 25-C4 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. *J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boctel, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes*. **279**, 177, 39-A1 (1984)
- Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Znenchenko, and V. G. Kurt*. **280**, 150, 50-E14 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- Three Precise Gamma-Ray Burst Source Locations. *T. L. Cline, U. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Znenchenko, V. G. Kurt, and B. E. Schaefer*. **286**, L15, 126-F3 (1984)
- COCKE, W. J. Global Redshift Quantization. *W. G. Tiff and W. J. Cocke*. **287**, 492, 139-E4 (1984)
- COHEN, J. G. The Clusters of M33. *J. G. Cohen, S. E. Persson, and L. Searle*. **281**, 141, 62-D10 (1984)
- IUE Observations of the Clusters of the Magellanic Clouds. *J. G. Cohen, R. M. Rich, and S. E. Persson*. **285**, 595, 118-A12 (1984)
- Spectrophotometry of Compact Embedded Infrared Sources in the 0.6-1.0 Micron Wavelength Region. *P. J. McGregor, S. E. Persson, and J. G. Cohen*. **286**, 609, 129-G4 (1984)
- COHEN, MARTIN. Far-Infrared Studies of Herbig-Haro Objects and Their Exciting Stars. *Martin Cohen, Paul M. Harvey, Richard D. Schwartz, and Bruce A. Wilking*. **278**, 671, 33-C6 (1984)
- Far-Infrared Observations of Southern Herbig-Haro Objects. *Martin Cohen, Richard D. Schwartz, Paul M. Harvey, and Bruce A. Wilking*. **281**, 250, 63-E12 (1984)
- VLA Observations of T Tauri Stars. II. A Luminosity-limited Survey of Taurus-Auriga. *J. H. Bieging, Martin Cohen, and P. R. Schwartz*. **282**, 699, 82-F4 (1984)
- The Dust Content of the Planetary Nebula IC 3568. *Martin Cohen, J. Patrick Harrington, and Rhys Hess*. **283**, 687, 94-D9 (1984)
- The 1984 Supernova in NGC 3169: Evidence for a Superwind. *Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz*. **287**, L69, 145-D7 (1984)
- COHEN, N. L. The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney*. **287**, 538, 140-A11 (1984)
- COHN, HALDAN. Is There Life after Core Collapse in Globular Clusters? *Haldan Cohn and Piet Hut*. **277**, L45, 22-E10 (1984)
- COLEMAN, LAWRENCE A. Chromospheric Lines in Red Dwarf Flare Stars. II. EV Lacertae, EQ Pegasi A, and V1054 Ophiuchi. *Bjorn R. Pettersen, David S. Evans, and Lawrence A. Coleman*. **282**, 214, 76-C4 (1984)
- The Flare Activity of AD Leonis. *Bjorn R. Pettersen, Lawrence A. Coleman, and David S. Evans*. **54**, 375, 7-A2 (1984) (Abstr. in **277**, 907, 22-A8)
- COLEY, A. A. Imperfect Fluid Cosmologies with Thermodynamics: Some Exact Solutions. *A. A. Coley and B. O. J. Tupper*. **280**, 26, 49-C6 (1984)
- COLLINS, G. W., II. On the Thermonuclear Origin of the Gamma-Rays from SS 433. *R. N. Boyd, M. Wiescher, G. H. Newsom, and G. W. Collins II*. **276**, L9, 5-E9 (1984)
- COLPI, M. Two-Temperature Model of Spherical Accretion onto a Black Hole. *M. Colpi, L. Maraschi, and A. Treves*. **280**, 319, 52-D11 (1984)
- COLVIN, M. A Search for Interstellar Silicon Nitride. *L. M. Ziurys, D. P. Clemens, R. J. Saykaly, M. Colvin, and H. F. Schaefer*. **281**, 219, 63-C9 (1984)
- COMBI, M. R. Io's Sodium Directional Features: Evidence for a Magnetospheric-Wind-driven Gas Escape Mechanism. *C. B. Pilcher, W. H. Smyth, M. R. Combi, and J. H. Fertel*. **287**, 427, 137-E7 (1984)
- COMINS, NEIL. Stochastic Self-propagating Star Formation in Three-dimensional Disk Galaxy Simulations: Erratum. *Thomas Statler, Neil Comins, and Bruce Smith*. **280**, 937, 60-B1 (1984) (Orig. paper in **270**, 79, 77-G3)
- COMINS, NEIL F. Bursts of Star Formation in Computer Simulations of

- Dwarf Galaxies. Neil F. Comins. **284**, 90, 99-A3 (1984)
- COMINSKY, L. Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- COMINSKY, L. R. X-Ray Observations of the Burst Source MXB 1728 - 34. E. M. Basinska, W. H. G. Lewin, M. Sztajno, L. R. Cominsky, and F. J. Marshall. **281**, 337, 64-E9 (1984)
- Discovery of a 7.1 Hour Period and Eclipses from MXB 1659 - 29. L. R. Cominsky and K. S. Wood. **283**, 765, 95-C8 (1984)
- CONDON, J. J. 4C 29.47: Quasi-periodic Outbursts Recorded by Precessing Jets? J. J. Condon and K. J. Mitchell. **276**, 472, 6-F8 (1984)
- The Spectral Evolution of Low-Frequency Variable Radio Sources. Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon. **281**, L55, 73-A4 (1984)
- Cosmological Evolution of Radio Sources Found at 1.4 GHz. J. J. Condon. **284**, 44, 98-D7 (1984)
- Cosmological Evolution of Radio Sources. J. J. Condon. **287**, 461, 139-C1 (1984)
- CONRATH, B. J. The Helium Abundance of Saturn from Voyager Measurements. B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein. **282**, 807, 83-G8 (1984)
- CONTI, P. S. Mass Loss in O-Type Stars: Parameters Which Affect It. C. D. Garmany and P. S. Conti. **284**, 705, 106-F8 (1984)
- CONTI, PETER S. Absolute Spectrophotometry of Wolf-Rayet Stars from 1200 to 7000 Å: A Cautionary Tale. Catharine D. Garmany, Philip Massey, and Peter S. Conti. **278**, 233, 26-E3 (1984)
- The Spectra of Wolf-Rayet Stars. II. The WC 9 Subclass. Ana V. Torres and Peter S. Conti. **280**, 181, 51-A6 (1984)
- Spectroscopic Studies of Wolf-Rayet Stars with Absorption Lines. VIII. HD 193793. Peter S. Conti, Diane Roussel-Dupré, Philip Massey, and Michael Rensing. **282**, 693, 82-E11 (1984)
- COOK, W. R. Elemental Composition of Solar Energetic Particles. W. R. Cook, E. C. Stone, and R. E. Vogt. **279**, 827, 46-G3 (1984)
- COOKE, B. A. HEAO 1 High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primi, and W. H. G. Lewin. **285**, 258, 112-F9 (1984)
- COOPER, J. Radiative Transfer Equations in Broad-Band, Time-varying Fields. J. Cooper and P. Zoller. **277**, 813, 21-A8 (1984)
- CORBALLY, CHRISTOPHER J. Close Visual Binaries. II. Quantitative Test of Isochrones. Christopher J. Corbally. **285**, 195, 112-B1 (1984)
- Close Visual Binaries. I. ML Classifications. Christopher J. Corbally. **55**, 657, 20-E8 (1984) (Abstr. in **282**, 822, 84-A12)
- CORDES, J. M. Multifrequency Timing Measurements on the Millisecond Pulsar PRS 1937 + 214. J. M. Cordes and Daniel R. Stinebring. **277**, L53, 22-F4 (1984)
- Constraints on the Progenitor Binary System for PSR 1913 + 16. J. M. Cordes and I. Wasserman. **279**, 798, 46-E2 (1984)
- Small-Scale Variation in the Galactic Magnetic Field: The Rotation Measure Structure Function and Birefringence in Interstellar Scintillations. J. H. Simonetti, J. M. Cordes, and S. R. Spangler. **284**, 126, 99-D9 (1984)
- Pulsar Polarization Fluctuations. I. 1404 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, Joanna M. Rankin, J. M. Weisberg, and Valentin Boriakoff. **55**, 247, 14-D9 (1984) (Abstr. in **280**, 939, 60-B3)
- Pulsar Polarization Fluctuations. II. 800 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, J. M. Weisberg, Joanna M. Rankin, and Valentin Boriakoff. **55**, 279, 14-G7 (1984) (Abstr. in **280**, 939, 60-B3)
- CORDOVA, F. A. Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. F. A. Cordova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire. **278**, 739, 34-A9 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sisko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- COREY, B. E. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth. **279**, 116, 38-C3 (1984)
- The Milli-arcsecond Images of Q0957 + 561. M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney. **287**, 538, 140-A11 (1984)
- CORNELL, M. E. The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis. **279**, 875, 47-D3 (1984)
- CORONITI, F. V. Confinement of the Crab Pulsar's Wind by Its Supernova Remnant. C. F. Kennel and F. V. Coroniti. **283**, 694, 94-E2 (1984)
- Magnetohydrodynamic Model of Crab Nebula Radiation. C. F. Kennel and F. V. Coroniti. **283**, 710, 94-F4 (1984)
- CORRIVEAU, GILLES. A Search for Faint Highly Polarized Objects. Ermano F. Borra and Gilles Corriveau. **276**, 449, 6-D11 (1984)
- CORSI, CARLO E. On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. Roberto Buonanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaïno, and William Liller. **277**, 220, 13-C12 (1984)
- The Population Structure of the Large Magellanic Cloud Bar. Eduardo Hardy, Roberto Buonanno, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer. **278**, 592, 32-D3 (1984)
- COSNER, KENNETH R. On the Production of Technetium in Thermally Pulsing Red Giant Stars. Kenneth R. Cosner, Keith H. Despain, and James W. Truran. **283**, 313, 89-D7 (1984)
- COSTAIN, C. H. The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. D. E. Harris, C. H. Costain, and P. E. Dewdney. **280**, 532, 55-F3 (1984)
- Extended Radio Observations of the SNR CTB 109. V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner. **283**, 147, 87-F1 (1984)
- COTTON, W. D. High-Resolution Observations of the Steep Spectrum Source 2147 + 145. W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Bååth, and J. Romney. **277**, L41, 22-E6 (1984)
- VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanromá, and A. Rius. **286**, 503, 128-E13 (1984)
- COUCH, WARRICK J. Distant Clusters of Galaxies. I. Uniform Photometry of Rich Clusters. Warrick J. Couch and E. B. Newell. **56**, 143, 23-E1 (1984) (Abstr. in **283**, 907, 96-F14)
- COURTIN, R. The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager Iris Spectra: NH₃, PH₃, C₂H₂, C₂H₄, CH₃D, CH₄, and the Saturnian D/H Isotopic Ratio. R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel. **287**, 899, 144-A14 (1984)
- COWAN, J. J. The Jet and Filaments in Cygnus A. R. A. Perley, J. W. Dreher, and J. J. Cowan. **285**, L35, 115-A5 (1984)
- COWAN, R. D. Analysis of Magnesium XI Line Profiles from Solar Active Regions. R. L. Blake, R. D. Cowan, H. Felthaus, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark. **282**, 784, 83-E13 (1984)
- A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. G. A. Doschek and R. D. Cowan. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- COWIE, L. L. Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu. **276**, 92, 2-A1 (1984)
- COWLEY, A. P. Optical Counterparts for X-Ray Sources in M31. D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck. **284**, 663, 106-C8 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles. **286**, 196, 124-B2 (1984)
- Studies of Late-Type Dwarfs. VI. Identification of Population II Main-Sequence Stars at $M_v = +14$. F. D. A. Hartwick, A. P. Cowley, and J. R. Mould. **286**, 269, 124-G6 (1984)
- COWLEY, ANNE P. IR Geminorum: Indications of a Massive White Dwarf and a Heated Secondary in this New SU Ursae Majoris Cataclysmic Variable. Paula Szkody, Allen W. Shafter, and Anne P. Cowley. **282**, 236, 76-D12 (1984)
- COWLEY, CHARLES R. An Analysis by Wavelength Coincidence Statistics of the Ultraviolet Spectrum of Kappa Cancri. George T. Chionacki, Charles R. Cowley, and Donald J. Bord. **286**, 736, 131-B11 (1984)
- COX, ARTHUR N. Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. Summer Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell. **281**, 800, 71-C4 (1984)
- Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. Arthur N. Cox, Bernard J. McNamara, and William Ryan. **284**, 250, 100-F13 (1984)
- COX, DONALD P. The Time Development of a Blast Wave with Shock-heated Electrons. Richard J. Edgar and Donald P. Cox. **283**, 833, 96-A9 (1984)
- COX, J. P. Overstable Magnetic Convection and the Rapidly Oscillating Ap Stars. J. P. Cox. **280**, 220, 51-D9 (1984)
- COX, JOHN P. Very Nonadiabatic Radial Pulsations in Luminous Helium

- Stars. *Hideyuki Saio, J. Craig Wheeler, and John P. Cox.* **281**, 318, 64-D4 (1984)
- Rotational Mode Splitting about an Inclined Axis. *Morris L. Aizenman, Carl J. Hansen, John P. Cox, and W. Dean Pesnell.* **286**, L43, 132-D13 (1984)
- CRABTREE, DENNIS R. Luminous Late-Type Stars in NGC 205. *Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett.* **287**, 138, 134-D9 (1984)
- CRAM, LAWRENCE E. The Response of Chromospheric Emission Lines to Flares on YZ C-nis Minoris. *Simon P. Worden, Timothy J. Schneeberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram.* **276**, 270, 3-F14 (1984)
- Dynamical Phenomena in Sunspots. I. Observing Procedures and Oscillatory Phenomena. *John H. Thomas, Lawrence E. Cram, and Alan H. Nye.* **285**, 368, 114-A1 (1984)
- Dynamical Phenomena in Sunspots. II. A Moving Magnetic Feature. *Alan H. Nye, John H. Thomas, and Lawrence E. Cram.* **285**, 381, 114-A14 (1984)
- CRAMPTON, D. Optical Imaging of 78 Quasars and Host Galaxies. *J. B. Hutchings, D. Crampton, and Bruce Campbell.* **280**, 41, 49-D8 (1984)
- Optical Counterparts for X-Ray Sources in M31. *D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck.* **284**, 663, 106-C8 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. *A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles.* **286**, 196, 124-B2 (1984)
- An Atlas of QSO Luminosity Profiles. *J. B. Hutchings, D. Crampton, B. Campbell, D. Duncan, and B. Glendinning.* **55**, 319, 15-C4 (1984) (Abstr. in **280**, 940, 60-B4)
- CRANNELL, C. J. The High-Energy X-Ray Spectrum of Centaurus XR-3 Observed from OSO 8. *J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig.* **278**, 266, 26-G8 (1984)
- CRAVENS, T. E. The Friable Sponge Model of a Cometary Nucleus. *M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Korosmezei, K. Kecskeny, A. F. Nagy, and K. Szego.* **278**, 449, 28-G5 (1984)
- CRAWFORD, M. D. The Intermediate Age SMC Globular Cluster Lindsay 113. *J. R. Mould, G. S. Da Costa, and M. D. Crawford.* **280**, 595, 56-C12 (1984)
- CRAWFORD, M. K. Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. *M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson.* **282**, L81, 85-C12 (1984)
- CRENSHAW, D. MICHAEL. Variability of the Emission-Line Spectra and Optical Continua of Seyfert Galaxies. II. *Bradley M. Peterson, Craig B. Foltz, D. Michael Crenshaw, Karie A. Meyers, and Paul L. Byard.* **279**, 529, 43-E13 (1984)
- CROMWELL, RICHARD H. The Time Dependence of Chromospheric Decay for Solar Type Stars. *Don C. Barry, Keith Hege, and Richard H. Cromwell.* **277**, L65, 22-G2 (1984)
- CRUDDACE, R. G. Contact Binary Stars. I. An X-Ray Survey. *R. G. Cruddace and A. K. Dupree.* **277**, 263, 13-G1 (1984)
- An X-Ray Survey of Clusters of Galaxies. IV. A Survey of Southern Clusters and a Compilation of Upper Limits for Both Abell and Southern Galaxies. *M. P. Kowalski, M. P. Ulmer, R. G. Cruddace, and K. S. Wood.* **56**, 403, 29-A9 (1984) (Abstr. in **286**, 822, 132-A13)
- CRUIKSHANK, D. P. Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. *D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga.* **284**, 799, 107-F8 (1984)
- CRUTCHER, RICHARD M. CN in Dark Interstellar Clouds. *Richard M. Crutcher, Ed Churchwell, and L. M. Ziurys.* **283**, 668, 94-C4 (1984)
- CRUZ-GONZALEZ, IRENE. Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. *Irene Cruz-Gonzalez, B. McBreen, and G. G. Fazio.* **279**, 679, 45-C6 (1984)
- CUDWORTH, KYLE M. Chemical Abundances in a New Halo Planetary Nebula. *Timothy Barker and Kyle M. Cudworth.* **278**, 610, 32-E8 (1984)
- CULHANE, J. L. SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. *A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley.* **279**, 866, 47-C8 (1984)
- CUMMINGS, A. C. Evidence that the Anomalous Cosmic-Ray Component is Singly Ionized. *A. C. Cummings, E. C. Stone, and W. R. Webber.* **287**, L99, 145-F8 (1984)
- CUMMINS, S. E. Identification of the SiCC Radical toward IRC +10216: The First Molecular Ring in an Astronomical Source. *P. Thaddeus, S. E. Cummins, and R. A. Linke.* **283**, L45, 97-B8 (1984)
- CUNNINGHAM, C. T. Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radozitcz.* **280**, 102, 50-B7 (1984)
- CUPERMAN, S. Numerical Investigation of Fluid Models with Full Electron and Proton Thermal Conduction Equations for the Quiet Solar Wind. *S. Cuperman, I. Tzur, and M. Dryer.* **286**, 763, 131-D10 (1984)
- CURRY, PATRICK J. The NGC 5128 Globular Cluster System: Star Counts in U, V, and R. *Gretchen L. H. Harris, James E. Hesser, Hugh C. Harris, and Patrick J. Curry.* **287**, 175, 134-G7 (1984)
- CUTRI, ROC M. The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. *Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner.* **280**, 521, 55-E6 (1984)
- The Luminous Host Galaxy and Anomalous Brackett-Gamma Line of Markarian 231. *Roc M. Cutri, G. H. Rieke, and M. J. Lebofsky.* **287**, 566, 140-C12 (1984)
- DA COSTA, G. S. The Anticorrelation of Cyanogen and CH on the Giant Branch of 47 Tucanae. *John Norris, K. C. Freeman, and G. S. Da Costa.* **277**, 615, 18-F10 (1984)
- Discovery of the First Carbon Star in NGC 6822. *M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman.* **277**, L9, 16-A9 (1984)
- Stellar Populations in Local Group Dwarf Elliptical Galaxies. II. NGC 205. *Jeremy Mould, Jerome Kristian, and G. S. Da Costa.* **278**, 575, 32-B12 (1984)
- The Intermediate Age SMC Globular Cluster Lindsay 113. *J. R. Mould, G. S. Da Costa, and M. D. Crawford.* **280**, 595, 56-C12 (1984)
- The Main-Sequence Turnoff of the Metal-rich Globular Cluster NGC 6171. *G. S. Da Costa, J. R. Mould, and S. Ortolani.* **282**, 125, 75-C9 (1984)
- The Age(?) of the Sculptor Dwarf Galaxy. *G. S. Da Costa.* **285**, 483, 116-F7 (1984)
- Main-Sequence Photometry of the SMC Globular Cluster Kron 3. *R. M. Rich, G. S. Da Costa, and J. R. Mould.* **286**, 517, 128-G1 (1984)
- DAHARI, OVED. The Spectrum of V348 Sagittarii. *Oved Dahari and Donald E. Osterbrock.* **277**, 648, 14-B7 (1984)
- DALGARNO, A. Photodissociation of OH in Interstellar Clouds. *Ewine F. van Dishoeck and A. Dalgarno.* **277**, 576, 18-C12 (1984)
- Deuterium Fractionation Mechanisms in Interstellar Clouds. *A. Dalgarno and S. Lepp.* **287**, L47, 138-F5 (1984)
- DANIEL, R. R. A Measurement of the Absolute Flux of Cosmic-Ray Electrons. *R. L. Golden, B. G. Mauget, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse.* **287**, 622, 141-A6 (1984)
- DANIELSON, G. E. Photometry of Resolved Galaxies. IV. Holmberg I and Holmberg II. *J. G. Hoessel and G. E. Danielson.* **286**, 159, 123-E9 (1984)
- DANKS, A. C. The CN Radical in Diffuse Interstellar Clouds. *S. R. Federman, A. C. Danks, and D. L. Lambert.* **287**, 219, 135-C11 (1984)
- DANZIGER, IVAN J. The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N-Log S. *Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub.* **283**, 495, 92-C1 (1984)
- DÄPPEN, WERNER. The Lithium Abundance of Hyades Main-Sequence Stars. *Roger Cayrel, Giusa Cayrel de Strobel, Bruce Campbell, and Werner Däppen.* **283**, 205, 88-C5 (1984)
- DARBRO, W. Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. *A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Darbro.* **276**, 691, 9-B1 (1984)
- X-Ray Observations of X Persei. *M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Naranan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland.* **278**, 711, 33-F5 (1984)
- DAS, M. K. The Effect of Rotation and the Magnetic Field on Solar Luminosity. *Harinder Pal Singh, M. K. Das, and J. N. Tandon.* **277**, 862, 21-E1 (1984)
- On Stellar Models with an Isothermal Core in the Presence of a Magnetic Field. *M. K. Das, Jayanta Kar, and J. N. Tandon.* **281**, 292, 64-B4 (1984)
- DATLA, RAJU U. Collisional Excitation Rate Coefficients for Fe XI. *Jieh-Shan Wang, Aray Marotta, and Raju U. Datla.* **279**, 460, 42-A8 (1984)
- DATTA, B. Rotating Neutron Star Structure: Implications of the Millisecond Pulsar PSR 1937 + 214. *A. Ray and B. Datta.* **282**, 542, 81-A10 (1984)
- DAUNT, S. J. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. *S. J. Daunt, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault.* **280**, 921, 59-G9 (1984)
- DAVID, LAURENCE P. Preferred Orbit Planes in Triaxial Galaxies. II. Tumbling about a Nonprincipal Axis. *Laurence P. David, Richard H. Durisen, and Thomas Y. Steiman-Cameron.* **286**, 53, 122-E1 (1984)
- DAVIDGE, T. J. A Study of the O'Connell Effect in the Light Curves of Eclipsing Binaries. *T. J. Davidge and E. F. Milone.* **55**, 571, 19-C1 (1984) (Abstr. in **282**, 820, 84-A10)
- DAVIDSON, J. A. Far-Infrared and Submillimeter Observations of the

- Low-Luminosity Protostars L1455 FIR and L1551 IRS 5: The Confinement of Bipolar Outflows. *J. A. Davidson and D. T. Jaffe*. **277**, L13, 16-A13 (1984)
- Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. *D. T. Jaffe, J. A. Davidson, M. Dragovan, and R. H. Hildebrand*. **284**, 637, 106-A10 (1984)
- On the Nature of the Material Surrounding Vega. *D. A. Harper, R. F. Loewenstein, and J. A. Davidson*. **285**, 808, 120-C8 (1984)
- DAVIES, J. Observations of Comet IRAS-Araki-Alcock 1983d. *R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer*. **278**, L11, 29-C14 (1984)
- DAVILA, JOSEPH M. The Scattering of Energetic Particles by Waves in a Finite β Plasma. *Joseph M. Davila and John S. Scott*. **280**, 334, 52-E12 (1984)
- The Interplanetary Scattering Mean Free Path: Collisionless Wave-damping Effects. *Joseph M. Davila and John S. Scott*. **285**, 400, 114-C5 (1984)
- DAVIS, LINDSEY E. The Distance to IC 1613 from Infrared Photometry of Cepheids. *Christopher W. McAlary, Barry F. Madore, and Lindsey E. Davis*. **276**, 487, 6-G10 (1984)
- DAVIS, MICHAEL M. The Sub-Millarcsecond Radio Structure of AO 0235 + 164. *Dayton L. Jones, Lars B. Bååth, Michael M. Davis, and Stephen C. Unwin*. **284**, 60, 98-E9 (1984)
- DAVIS, ROBERT J. Seven Poor Clusters of Galaxies. *Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis*. **283**, 33, 86-D3 (1984)
- DAVIS, SUMNER P. Oscillator Strengths of the C_2 $A^1\Pi_g - X^1\Sigma_g^+$ Phillips System. *Sumner P. Davis, Wm. Hayden Smith, James W. Brault, Rubén Pecnyer, and Jeremy Wagner*. **287**, 455, 137-G7 (1984)
- DAWSON, JOHN M. Stimulated Compton Scattering of Hydromagnetic Waves in the Interstellar Medium. *Padma K. Shukla and John M. Dawson*. **276**, L49, 10-F7 (1984)
- DEARBORN, D. S. WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? *M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne*. **282**, 763, 83-D4 (1984)
- DEARBORN, D. S. P. On the Composition of the Stellar Winds of the Most Massive Stars: 100 M_\odot to 2200 M_\odot . *D. S. P. Dearborn and J. B. Blake*. **277**, 783, 20-F3 (1984)
- Brightness Variations Caused by Surface Magnetic Fields in Pre-Main-Sequence Stars. *I. Appenzeller and D. S. P. Dearborn*. **278**, 689, 33-D10 (1984)
- DEARBORN, DAVID. The Formation and Early Dynamical Evolution of Bound Stellar Systems. *Charles J. Lada, Michael Margulis, and David Dearborn*. **285**, 141, 111-D14 (1984)
- DE BERNARDIS, P. Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. *P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno*. **278**, 150, 25-F2 (1984)
- DE BERNARDIS, P. Photon Mass and Cosmic Microwave Background Anisotropy. *P. de Bernardis, S. Masi, F. Melchiorri, and A. Moletti*. **284**, L21, 109-A4 (1984)
- DECKER, R. B. Estimate of Cosmic-Ray Latitudinal Gradient in 1981-1982. *R. B. Decker, S. M. Krimigis, and D. Venkatesan*. **278**, L119, 36-C7 (1984)
- DEETER, J. E. Techniques for the Estimation of Red Power Spectra. II. Evaluation of Alternative Methods. *J. E. Deeter*. **281**, 482, 65-B11 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yentis*. **283**, L53, 97-C2 (1984)
- DEFREES, D. J. Calculations Concerning the HCO^+ / HOC^+ Abundance Ratio in Dense Interstellar Clouds. *D. J. DeFrees, A. D. McLean, and Eric Herbst*. **279**, 322, 40-E3 (1984)
- DEGIOIA-EASTWOOD, K. Massive Star Formation in NGC 6946. *K. DeGioia-Eastwood, G. L. Grasdale, S. E. Strom, and K. M. Strom*. **278**, 564, 32-B1 (1984)
- DE GRAUW, T. Solar Limb Brightening at 820 Microns. *C. Lindsay, T. de Grauw, C. de Vries, and S. Lidholm*. **277**, 424, 15-D14 (1984)
- DEGUCHI, SHUJI. The Spin Temperature of Atomic Hydrogen in Very Low Density Gas outside of Galaxies. *William D. Watson and Shuji Deguchi*. **281**, L5, 65-E6 (1984)
- Linear Polarization of Molecular Lines at Radio Frequencies. *Shuji Deguchi and William D. Watson*. **285**, 126, 111-C12 (1984)
- Infrared Pumping for HC_3N in the Circumstellar Envelope of IRC +10216. *Shuji Deguchi and Masakatsu Ueyemura*. **285**, 153, 111-E12 (1984)
- DE JONG, T. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olnon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- Observations of Comet IRAS-Araki-Alcock 1983d. *R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer*. **278**, L11, 29-C14 (1984)
- Discovery of a Shell around Alpha Lyrae. *H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius*. **278**, L23, 29-D12 (1984)
- Far-Infrared Observations of the Crab Nebula. *P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olnon*. **278**, L29, 29-E3 (1984)
- IRAS Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olnon, and P. R. Wesselius*. **278**, L33, 29-E7 (1984)
- IRAS Observations of OH/IR Stars. *F. M. Olnon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch*. **278**, L41, 29-E13 (1984)
- Infrared Emission from M31. *H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer*. **278**, L59, 30-A1 (1984)
- IRAS Observations of Shapley-Ames Galaxies. *T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond*. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. *B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young*. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). *E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier*. **278**, L75, 30-C9 (1984)
- DEKEL, AVISHAI. Alignments of Clusters of Galaxies as a Probe for Superclusters. *Avishai Dekel, Michael J. West, and Sverre J. Aarseth*. **279**, 1, 37-A6 (1984)
- The Spatial Correlation Function of Galaxies Confronted with Theoretical Scenarios. *Avishai Dekel and Sverre J. Aarseth*. **283**, 1, 86-A6 (1984)
- Superpancakes and the Cluster Correlation Function. *Avishai Dekel*. **284**, 445, 104-A11 (1984)
- DE LAETER, J. R. p -Process Nucleosynthesis and the Abundances of the Minor Isotopes of Tin. *J. R. De Laeter, K. J. R. Rosman, and R. D. Loss*. **279**, 814, 46-F4 (1984)
- DE LAPPARENT, VALERIE. The Shane-Wirtanen Counts. *Margaret J. Geller, Valerie de Lapparent, and Michael J. Kurtz*. **287**, L55, 145-C2 (1984)
- DE LOORE, C. Absolute Dimensions of Unevolved O Type Close Binaries. *C. Doom and C. de Loore*. **278**, 695, 33-E2 (1984)
- DELUCA, EDWARD E. The Response of Chromospheric Emission Lines to Flares on YZ Canis Minoris. *Simon P. Worden, Timothy J. Schneebberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram*. **276**, 270, 3-F14 (1984)
- DE LUCIA, FRANK C. Laboratory Submillimeter Transition Frequencies of ^7LiH and ^6LiH . *Grant M. Plummer, Eric Herbst, and Frank C. De Lucia*. **282**, L113, 85-F1 (1984)
- $^{13}\text{CH}_3\text{OH}$ in OMC-1. *Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia*. **286**, 586, 129-E8 (1984)
- Laboratory Millimeter and Submillimeter Spectra of HNO and DNO . *K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia*. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- The Millimeter and Submillimeter Laboratory Spectrum of Methyl Formate in its Ground Symmetric Torsional State. *Grant M. Plummer, Eric Herbst, Frank C. De Lucia, and Geoffrey A. Blake*. **55**, 633, 20-C10 (1984) (Abstr. in **282**, 821, 84-A11)
- DEMARQUE, P. Resonant Three-Wave Interactions of Solar g-Modes. *D. B. Guenther and P. Demarque*. **277**, L17, 16-B3 (1984)
- DEMOULIN-ULRICH, M.-H. Extended Gaseous Emission in Normal Elliptical Galaxies. *M.-H. Demoulin-Ulrich, H. R. Butcher, and A. Boksenberg*. **285**, 527, 117-C4 (1984)
- DENNIS, B. R. A Study of the Evolution of Energetic Electrons in a Solar Flare. *Gordon D. Holman, M. R. Kundu, and B. R. Dennis*. **276**, 761, 9-G1 (1984)
- The High-Energy X-Ray Spectrum of Centaurus XR-3 Observed from OSO 8. *J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig*. **278**, 266, 26-G8 (1984)
- SMM Observations of $K\alpha$ Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. *A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G.*

- Rapley. **279**, 866, 47-C8 (1984)
 The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. *M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis*. **279**, 875, 47-D3 (1984)
- The Energetics of Chromospheric Evaporation in Solar Flares. *E. Antonucci, A. H. Gabriel, and B. R. Dennis*. **287**, 917, 144-C4 (1984)
- Fast Variations in High-Energy X-Rays from Solar Flares and Their Constraints on Nonthermal Models. *Alan L. Kiplinger, B. R. Dennis, K. J. Frost, and L. E. Orwig*. **287**, L105, 145-F13 (1984)
- DENNISON, BRIAN. The Spectral Evolution of Low-Frequency Variable Radio Sources. *Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon*. **281**, L55, 73-A4 (1984)
- DENT, W. A. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- DENT, WILLIAM A. The 20 Year Spectral Evolution of the Radio Nucleus of NGC 1275. *Christopher P. O'Dea, William A. Dent, and Thomas J. Balonek*. **278**, 89, 25-A5 (1984)
- DENTON, RICHARD E. The Relation of Electron Temperature to Emission Measure and Limits of Increase in Emission Measure in Soft X-Ray Flares. *Richard E. Denton and Uri Feldman*. **286**, 359, 125-G2 (1984)
- DE PATER, IMKE. A Radio Source Occultation Experiment with Comet Austin 1982g, with Unusual Results. *Imke de Pater and Wing-H. Ip*. **283**, 895, 96-F2 (1984)
- Very Large Array Observations of Jupiter's Nonthermal Radiation. *Imke de Pater and Walter J. Jaffe*. **54**, 405, 7-C10 (1984) (Abstr. in **277**, 908, 22-A9)
- DEPOY, D. L. The Location of Infrared Sources in the Galactic Center from a Deep 1 Micron CCD Image. *J. P. Henry, D. L. DePoy, and E. E. Becklin*. **285**, L27, 114-G12 (1984)
- DERE, K. P. High-Resolution Telescope and Spectrograph Observations of the Quiet Solar Chromosphere and Transition Zone. *K. P. Dere, J.-D. F. Bartoe, and G. E. Brueckner*. **281**, 870, 72-A6 (1984)
- DERMER, CHARLES D. The Production Spectrum of a Relativistic Maxwell-Boltzmann Gas. *Charles D. Dermer*. **280**, 328, 52-E6 (1984)
- DE ROBERTIS, M. M. An Analysis of the Narrow-Line Profiles in High Ionization Seyfert Galaxies. *M. M. De Robertis and D. E. Osterbrock*. **286**, 171, 123-G5 (1984)
- DESAI, U. Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilcavsky, and C. Motch*. **286**, L5, 126-D7 (1984)
- DESAI, U. D. Three Precise Gamma-Ray Burst Source Locations. *T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer*. **286**, L15, 126-F3 (1984)
- DES FORÊTS, G. Stability of Gravitational Systems and Gravothermal Catastrophe in Astrophysics. *J. F. Sygnet, G. Des Forêts, M. Lachièze-Rey, and R. Pellat*. **276**, 737, 9-E5 (1984)
- Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. *G. Des Forêts, R. Dominguez-Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solé*. **280**, 15, 49-B9 (1984)
- DESPAIN, KEITH H. On the Production of Technetium in Thermally Pulsing Red Giant Stars. *Kenneth H. Despain, Keith H. Despain, and James W. Truran*. **283**, 313, 89-D7 (1984)
- DEUPREE, ROBERT G. Two- and Three-Dimensional Numerical Simulations of the Core Helium Flash. *Robert G. Deupree*. **282**, 274, 76-G8 (1984)
- Two- and Three-dimensional Numerical Simulations of the Hydrodynamic Phase of the Core Helium Flash. *Robert G. Deupree*. **287**, 268, 135-G5 (1984)
- DE VAUCOULEURS, G. The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. *L. Bottinelli, L. Gouguenheim, G. Paturel, and G. de Vaucouleurs*. **280**, 34, 49-C14 (1984)
- The Dependence on Distance and Redshift of the Velocity Vectors of the Sun, the Galaxy, and the Local Group with Respect to Different Extragalactic Frames of Reference. *G. de Vaucouleurs and W. L. Peters*. **287**, 1, 133-A6 (1984)
- A Comparison of Distance Scales for Early-Type Galaxies. *G. de Vaucouleurs and D. W. Olson*. **56**, 91, 22-G10 (1984) (Abstr. in **283**, 907, 96-F14)
- DE VRIES, C. Solar Limb Brightening at 820 Microns. *C. Lindsay, T. de Graauw, C. de Vries, and S. Lidholm*. **277**, 424, 15-D14 (1984)
- DEWDNEY, P. E. The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. *D. E. Harris, C. H. Costain, and P. E. Dewdney*. **280**, 532, 55-F3 (1984)
- DE YOUNG, DAVID S. Radio Jets in Classical Double Radio Sources with Strong Cores. *Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia*. **283**, 515, 92-D12 (1984)
- D'HENDECOURT, L. Absorption Features in the 5-8 Micron Spectra of Protostars. *A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn*. **287**, 697, 142-A1 (1984)
- DICKEL, HÉLÈNE R. An Aperture Synthesis Map of HCN Emission Close to W3 IRS 4. *Melvin C. H. Wright, Hélène R. Dickel, and Paul T. P. Ho*. **281**, L71, 73-B6 (1984)
- DICKEL, JOHN R. A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. *Y. Matsui, Knox S. Long, John R. Dickel, and Eric W. Greisen*. **287**, 295, 136-B9 (1984)
- DICKEY, J. M. 1.4 GHz Continuum Sources in the Hercules Cluster. *J. M. Dickey and E. E. Salpeter*. **284**, 461, 104-B13 (1984)
- DICKINSON, D. F. A Search for 183 GHz Emission from Water in Late-Type Stars. *T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodríguez Kuiper, and P. Zimmerman*. **286**, 310, 125-C9 (1984)
- DICKINSON, DALE F. Methyl Acetylene as a Temperature Probe for Dense Interstellar Clouds. *T. B. H. Kuiper, E. N. Rodríguez Kuiper, Dale F. Dickinson, B. E. Turner, and B. Zuckerman*. **276**, 211, 3-B9 (1984)
- 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. *T. B. H. Kuiper, E. N. Rodríguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann*. **283**, 106, 87-B13 (1984)
- DICKMAN, R. L. Large-Scale Structure of the Taurus Molecular Complex. I. Density Fluctuations—A Fossil Jeans Length? *S. C. Kleiner and R. L. Dickman*. **286**, 255, 124-F6 (1984)
- DIETRICH, F. S. The $^{13}\text{N}(p,\gamma)^{14}\text{O}$ Thermonuclear Reaction Rate and the Hot CNO Cycle. *G. J. Mathews and F. S. Dietrich*. **287**, 969, 144-G1 (1984)
- DINERSTEIN, H. L. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. *R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey*. **276**, 551, 7-E9 (1984)
- DINERSTEIN, HARRIET L. Evidence for an Infrared Disk in the Core of the Extraordinary Planetary Nebula Abell 30. *Harriet L. Dinerstein and Daniel F. Lester*. **281**, 702, 70-B11 (1984)
- An Infrared Disk at the Center of the Bipolar Planetary Nebula NGC 6302. *Daniel F. Lester and Harriet L. Dinerstein*. **281**, L67, 73-B2 (1984)
- DISTLER, J. On the Topological Stability of Magnetostatic Equilibria. *K. C. Tsinganos, J. Distler, and R. Rosner*. **278**, 409, 28-D4 (1984)
- DJORGOSKI, S. Surface Photometry in Cores of Globular Clusters. *S. Djorgovski and Juan R. King*. **277**, L49, 22-E14 (1984)
- 3C 324—An Extremely Distant Cluster Radio Galaxy. *Hyron Spinrad and S. Djorgovski*. **280**, L9, 54-C11 (1984)
- Discovery of a New Gravitational Lens. *S. Djorgovski and H. Spinrad*. **282**, L1, 78-A2 (1984)
- Spectroscopy of Extremely Distant Radio Galaxies. *Hyron Spinrad and S. Djorgovski*. **285**, L49, 121-D4 (1984)
- DOBSON, C. A. The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baiy, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson*. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- D'ODORICO, S. IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti*. **278**, 124, 25-D2 (1984)
- D'ODORICO, SANDRO. Radiative Shock-Wave Theory. I. Chemical Abundance Diagnostics and Galactic Abundance Gradients. *Michael A. Dopita, Luc Binette, Sandro D'Odorico, and Piero Benvenuti*. **276**, 653, 8-F2 (1984)
- DOERING, C. R. The Formation of Massive Stars along the W5 Ionization Front. *B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering*. **279**, 291, 40-B12 (1984)
- DOI, K. Short-Term X-Ray Variability of GX 339-4. *Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi*. **285**, 712, 119-C7 (1984)
- DOIRON, D. J. VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. *R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips*. **278**, 220, 26-D4 (1984)
- DOLAN, J. F. The High-Energy X-Ray Spectrum of Centaurus XR-3

- Observed from *OSO 8*. J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig. **278**, 266, 26-G8 (1984)
- DOLIDZE, V. SH. Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, J. G. Mirofanev, I. V. Studin, V. M. Zenchenko, and V. Sh. Dolidze. **286**, L11, 126-D14 (1984)
- DOMINGUEZ-TENREIRO, R. Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. G. Des Forêts, R. Dominguez-Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solé. **280**, 15, 49-B9 (1984)
- DOMINY, JAMES F. The Chemical Composition and Evolutionary State of the Early R Stars. James F. Dominy. **55**, 27, 11-C1 (1984) (Abstr. in **279**, 909, 47-F14)
- DONN, B. The Dust around R Coronae Borealis Type Stars. J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu. **280**, 228, 51-E3 (1984)
- DOOM, C. Absolute Dimensions of Unevolved O Type Close Binaries. C. Doom and C. de Loore. **278**, 695, 33-E2 (1984)
- DOPITA, M. A. Shock Waves in Mira Variables. I. Emission-Line Spectra. M. W. Fox, P. R. Wood, and M. A. Dopita. **286**, 337, 125-E8 (1984)
- Supernova Remnants in the Magellanic Clouds. D. S. Mathewson, V. L. Ford, M. A. Dopita, J. R. Tuohy, B. Y. Mills, and A. J. Turtle. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- DOPITA, MICHAEL A. Radiative Shock-Wave Theory. I. Chemical Abundance Diagnostics and Galactic Abundance Gradients. Michael A. Dopita, Luc Binette, Sandro D'Odorico, and Piero Benvenuti. **276**, 653, 8-F2 (1984)
- Spectrophotometry of Young Supernova Remnants. Michael A. Dopita and Ian R. Tuohy. **282**, 135, 75-D7 (1984)
- Radiative Shock Wave Theory. III. The Nature of the Optical Emission in Young Supernova Remnants. Michael A. Dopita, Luc Binette, and Ian R. Tuohy. **282**, 142, 75-D14 (1984)
- The 1984 Supernova in NGC 3169: Evidence for a Superwind. Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz. **287**, L69, 145-D7 (1984)
- DOSCHEK, G. A. On the Rate of Energy Input in Thermal Solar Flares. U. Feldman, G. A. Doschek, and D. L. McKenzie. **276**, L53, 10-F10
- The Effects of a Multidensity Plasma on Ultraviolet Spectroscopic Electron Density Diagnostics. G. A. Doschek. **279**, 446, 41-G7 (1984)
- The Possibility of Steady State Nonionization Equilibrium Conditions in Soft X-Ray Flare Plasmas. G. A. Doschek. **283**, 404, 90-D5 (1984)
- A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. G. A. Doschek and R. D. Cowan. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- DOSCHEK, GEORGE A. Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek. **286**, 787, 131-F6 (1984)
- DOTY, J. P. The *HEAO 1* A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- DOWNES, D. The Kleinmann-Low Nebula: An Infrared Cavity. C. G. Wynn-Williams, R. Genzel, E. E. Becklin, and D. Downes. **281**, 172, 62-F14 (1984)
- DOWNES, RONALD A. Rapid Intensity Variability in the Jets of SS 433. Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes. **281**, 313, 64-C13 (1984)
- DOWTHWAITE, J. C. Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. J. C. Douthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley. **286**, L35, 132-D6 (1984)
- DOYLE, LAURANCE R. The Space Orientation of Stars. Laurance R. Doyle, Thomas J. Wilcox, and Jean J. Lore. **287**, 307, 136-C10 (1984)
- DRAGOVAN, M. Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. D. T. Jaffe, J. A. Davidson, M. Dragovan, and R. H. Hildebrand. **284**, 637, 106-A10 (1984)
- Detection of Submillimeter Polarization in the Orion Nebula. R. H. Hildebrand, M. Dragovan, and G. Novak. **284**, L51, 109-C7 (1984)
- DRAINE, B. T. The Infrared Signature of Graphite Grains. B. T. Draine. **277**, L71, 22-G8 (1984)
- Thermal Evaporation of Spherical Clouds: Effects of Viscous Stresses. B. T. Draine and J. L. Giuliani, Jr. **281**, 690, 70-A13 (1984)
- CO Line Emission from Shock Waves in Molecular Clouds. B. T. Draine and W. G. Roberge. **282**, 491, 80-E1 (1984)
- Optical Properties of Interstellar Graphite and Silicate Grains. B. T. Draine and Hyung Mok Lee. **285**, 89, 111-A3 (1984)
- DRAKE, S. A. The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. S. A. Drake, A. Brown, and J. L. Linsky. **284**, 774, 107-D10 (1984)
- DREHER, J. W. Ultracompact Structure in the H II Region W49N. J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker. **283**, 632, 93-G6 (1984)
- The Jet and Filaments in Cygnus A. R. A. Perley, J. W. Dreher, and J. J. Cowan. **285**, L35, 115-A5 (1984)
- DRESSLER, ALAN. Internal Kinematics of Galaxies in Clusters. I. Velocity Dispersions for Elliptical Galaxies in Coma and Virgo. Alan Dressler. **281**, 512, 68-B10 (1984)
- Studying the Internal Kinematics of Galaxies Using the Calcium Infrared Triplet. Alan Dressler. **286**, 97, 123-A3 (1984)
- DRILLING, J. S. LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? D. Schönberner and J. S. Drilling. **276**, 229, 3-D1 (1984)
- Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray. **278**, 224, 26-D8 (1984)
- Effective Temperatures and Luminosities of Very Hot O Type Subdwarfs. D. Schönberner and J. S. Drilling. **278**, 702, 33-E9 (1984)
- Broad-Band Photometry of Extreme Helium Stars. J. S. Drilling, A. U. Landolt, and D. Schönberner. **279**, 748, 46-A7 (1984)
- Far-Ultraviolet Spectrophotometry of Two Very Hot O Type Subdwarfs. J. S. Drilling, J. B. Holberg, and D. Schönberner. **283**, L67, 97-D3 (1984)
- DRYER, M. Numerical Investigation of Fluid Models with Full Electron and Proton Thermal Conduction Equations for the Quiet Solar Wind. S. Cuperman, I. Tzur, and M. Dyer. **286**, 763, 131-D10 (1984)
- DUFOUT, REGINALD J. The Unique Planetary Nebula NGC 2818. Reginald J. Dufour. **287**, 341, 136-F3 (1984)
- DUFTON, P. L. The Nitrogen-deficient Cluster NGC 6231. F. P. Keenan, P. J. F. Brown, P. L. Dufton, and D. J. Lennon. **279**, L11, 42-D12 (1984)
- Observational Evidence for Non-Maxwellian Electron Energy Distributions in the Solar Transition Region. P. L. Dufton, A. E. Kingston, and F. P. Keenan. **280**, L35, 54-E11 (1984)
- Interstellar Magnesium Abundances. M. J. Murray, P. L. Dufton, A. Hibbert, and D. G. York. **282**, 481, 80-D5 (1984)
- DULEY, W. W. Refractive Indices for Amorphous Carbon. W. W. Duley. **287**, 694, 141-G11 (1984)
- DULK, G. A. Radio-Frequency Heating of the Coronal Plasma during Flares. D. B. Melrose and G. A. Dulk. **282**, 308, 77-C1 (1984)
- DUNCAN, D. An Atlas of QSO Luminosity Profiles. J. B. Hutchings, D. Crampton, B. Campbell, D. Duncan, and B. Glendenning. **55**, 319, 15-C4 (1984) (Abstr. in **280**, 940, 60-B4)
- DUNCAN, D. K. Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan. **279**, 763, 46-B8 (1984)
- A Study of the Dependence of Mg II Emission on the Rotational Periods of Main-Sequence Stars. L. Hartmann, S. L. Baliunas, D. K. Duncan, and R. W. Noyes. **279**, 778, 46-C10 (1984)
- Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Baliunas, E. Belsere, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)
- DUNCAN, ROBERT C. Neutrino Emissivity of Interacting Quark Matter in Neutron Stars. II. Finite Neutrino Momentum Effects. Robert C. Duncan, Stuart L. Shapiro, and Ira Wasserman. **278**, 806, 34-F6 (1984)
- DUNCAN, W. D. Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin. **284**, 118, 99-D1 (1984)
- DUPREE, A. K. Contact Binary Stars. I. An X-Ray Survey. R. G. Cruddace and A. K. Dupree. **277**, 263, 13-G1 (1984)
- IUE Observations of Centaurus X-4 during the 1979 May Outburst. William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank. **278**, 270, 27-A1 (1984)
- Chromospheres and Mass Loss in Metal-deficient Giant Stars. A. K. Dupree, L. Hartmann, and E. H. Avrett. **281**, L37, 66-G7 (1984)
- Ultraviolet Flare on Lambda Andromedae. S. L. Baliunas, E. F. Guinan, and A. K. Dupree. **282**, 733, 83-B1 (1984)
- DURAND, DANIEL. The Population Structure of the Wing of the Small Magellanic Cloud. Eduardo Hardy and Daniel Durand. **279**, 567, 44-A13 (1984)
- The Clusters NGC 419 and NGC 416 in the Wing of the Small Magellanic Cloud. Daniel Durand, Eduardo Hardy, and Jorge Melnick. **283**, 552, 92-G7 (1984)
- DURISEN, RICHARD H. Preferred Orbit Planes in Triaxial Galaxies. I. Tumbling about a Principal Axis. Thomas Y. Steiman-Cameron and Richard H. Durisen. **276**, 101, 2-A10 (1984)
- A Numerical Study of the Stability of Radiative Shocks. James N. Inamura, Michael T. Wolff, and Richard H. Durisen. **276**, 667, 8-G2 (1984)
- Preferred Orbit Planes in Triaxial Galaxies. II. Tumbling about a Nonprincipal Axis. Laurence P. David, Richard H. Durisen, and Thomas

- Y. Steiman-Cameron. **286**, 53, 122-E1 (1984)
- DURNEY, B. R. On the Rotation Rate of Polar Features in the Sun. *B. R. Durney, S. L. Keil, and D. M. Lytle*. **281**, 455, 65-G10 (1984)
- DUROUCHOUX, PH. The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury*. **278**, 112, 25-C4 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. *J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes*. **279**, 177, 39-A1 (1984)
- DURRANCE, S. T. IUE Observations of Longitudinal and Temporal Variations in the Jovian Auroral Emission. *T. E. Skinner, S. T. Durrance, P. D. Feldman, and H. W. Moos*. **278**, 441, 28-F11 (1984)
- DWEK, E. Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^\circ$ to $l = +62^\circ$: Structure and Energetics of the Inner Disk. *M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung*. **285**, 74, 110-F14 (1984)
- DWEK, ELIAHU. Infrared Photometry of Comet Bowell and Other Comets. *Michael F. A'Hearn, Eliahu Dwek, and Alan T. Tokunaga*. **282**, 803, 83-G4 (1984)
- DYCK, H. M. The Infrared Dust Shell around the WC9 Star Ve 2-45. *H. M. Dyck, Theodore Simon, and R. D. Wolstencroft*. **277**, 675, 19-D14 (1984)
- Discovery of Solar System-Size Halos around Young Stars. *S. Beckwith, B. Zuckerman, P. J. Skrutskie, and H. M. Dyck*. **287**, 793, 143-A2 (1984)
- Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. *H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith*. **287**, 801, 143-A10 (1984)
- DYER, C. C. Image Separation Statistics for Multiply Imaged Quasars. *C. C. Dyer*. **287**, 26, 133-C5 (1984)
- DYSON, J. E. Why Do Few High-Redshift QSO Narrow-Line Absorption Systems Exhibit Mixed Ionization Spectra? *T. W. Hartquist and J. E. Dyson*. **279**, L35, 48-A5 (1984)
- EARL, JAMES A. The Effect of Convection upon Charged Particle Transport in Random Magnetic Fields. *James A. Earl*. **278**, 825, 34-G11 (1984)
- EATON, JOEL A. Ultraviolet Photometry from the Orbiting Astronomical Observatory XXXIX. The Structure of the Eclipsing Wolf-Rayet Binary V444 Cygni as Derived from Light Curves between 2460 Å and 3.5 Microns. *A. M. Cherepashchuk, Joel A. Eaton, and Kh. F. Khaliullin*. **281**, 774, 71-A4 (1984)
- Line Identifications in the Ultraviolet (2590–3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. *Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton*. **283**, 760, 95-C2 (1984)
- ECKART, A. The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. *K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus*. **280**, 542, 55-F13 (1984)
- EDGAR, B. K. Alternating-Side Ejection in Extragalactic Radio Sources. *L. Rudnick and B. K. Edgar*. **279**, 74, 37-G2 (1984)
- EDGAR, RICHARD J. The Time Development of a Blast Wave with Shock-heated Electrons. *Richard J. Edgar and Donald P. Cox*. **283**, 833, 96-A9 (1984)
- EDWARD, GEOFFREY. The Magnetic Fields of the Late-Type Stars. *Ermanno F. Borra, Geoffrey Edward, and M. Mayor*. **284**, 211, 100-D2 (1984)
- EDWARDS, SUZAN. A Survey of High-Velocity Molecular Gas near Herbig-Haro Objects. II. *Suzan Edwards and Ronald L. Snell*. **281**, 237, 63-D13 (1984)
- Brackett-Alpha Line Profiles of Young Stellar Objects. *S. E. Persson, T. R. Geballe, Peter J. McGregor, Suzan Edwards, and Carol J. Lonsdale*. **286**, 289, 125-A14 (1984)
- EDWIN, P. M. On Coronal Oscillations. *B. Roberts, P. M. Edwin, and A. O. Benz*. **279**, 857, 47-B12 (1984)
- EFSTATHIOU, G. Cosmic Background Radiation Anisotropies in Universes Dominated by Nonbaryonic Dark Matter. *J. R. Bond and G. Efsthathiou*. **285**, L45, 121-C13 (1984)
- EGGEN, OLIN J. The A0 Stars. *Olin J. Eggen*. **55**, 597, 20-A1 (1984) (Abstr. in **282**, 821, 84-A11)
- The A0 Stars: Erratum. *Olin J. Eggen*. **56**, 650, 33-C3 (1984) (Orig. paper in **55**, 597, 20-A1)
- EICHLER, DAVID. On the Theory of Cosmic-Ray-Mediated Shocks with Variable Compression Ratio. *David Eichler*. **277**, 429, 15-E7 (1984)
- Monte Carlo Shock-like Solutions to the Boltzmann Equation with Collective Scattering. *Donald C. Ellison and David Eichler*. **286**, 691, 130-F5 (1984)
- EILEK, J. A. What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen*. **278**, 37, 24-D6 (1984)
- EILEK, JEAN A. The Electron Energy Spectrum Produced in Radio Sources by Turbulent, Resonant Acceleration. *Jean A. Eilek and Richard N. Henriksen*. **277**, 820, 21-B1 (1984)
- ELBERT, J. W. Limits on Astrophysical ν_e Flux at $E_\nu > 10^{19}$ eV. *R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck*. **281**, L9, 65-E10 (1984)
- Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. *J. Boone, R. Cady, G. L. Cassidy, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech*. **285**, 264, 112-G1 (1984)
- ELITZUR, MOSHE. On Hydrogen Line Emission from Regions Exposed to Strong Radiation Fields. *Moshe Elitzur*. **280**, 653, 57-A6 (1984)
- Radiation Pressure and the Stability of Broad-Line Region Clouds. *G. J. Ferland and Moshe Elitzur*. **285**, L11, 114-F11 (1984)
- ELLISON, DONALD C. Monte Carlo Shock-like Solutions to the Boltzmann Equation with Collective Scattering. *Donald C. Ellison and David Eichler*. **286**, 691, 130-F5 (1984)
- ELMEGREEN, BRUCE G. A Galactic Disk is Not a True Exponential. *Philip E. Seiden, Lawrence S. Schulman, and Bruce G. Elmegreen*. **282**, 95, 75-A7 (1984)
- Blue and Near-Infrared Surface Photometry of Spiral Structure in 34 Nonbarred Grand Design and Flocculent Galaxies. *Debra Meloy Elmegreen and Bruce G. Elmegreen*. **54**, 127, 2-E13 (1984) (Abstr. in **275**, 929, 147-F2)
- ELMEGREEN, DEBRA MELOY. Blue and Near-Infrared Surface Photometry of Spiral Structure in 34 Nonbarred Grand Design and Flocculent Galaxies. *Debra Meloy Elmegreen and Bruce G. Elmegreen*. **54**, 127, 2-E13 (1984) (Abstr. in **275**, 929, 147-F2)
- ELSNER, R. F. Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. *A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Darbro*. **276**, 691, 9-B1 (1984)
- Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Magnetosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. *R. F. Elsner and F. K. Lamb*. **278**, 326, 27-E4 (1984)
- X-Ray Observations of X Persei. *M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Naranan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland*. **278**, 711, 33-F5 (1984)
- ELVIS, M. An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **277**, 115, 12-B12 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- ELVIS, MARTIN. X-Ray and UV Observations of Two Radio-bright Quasars. *Martin Elvis and G. Fabbiano*. **280**, 91, 50-A8 (1984)
- 1–20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward*. **280**, 514, 56-B5 (1984)
- Very Low Luminosity Active Galaxies and the X-Ray Background. *Martin Elvis, Andrzej Soltan, and William C. Keel*. **283**, 479, 92-A13 (1984)
- EMERSON, J. P. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. *M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker*. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. *M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker*. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius*. **278**, L19, 29-D8 (1984)
- Far-Infrared Observations of the Crab Nebula. *P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olmon*. **278**, L29, 29-E3 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. *C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young*. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46–47. *J. P. Emerson, S. Harris, R. E. Jennings, C. A.*

- Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- ENSLIE, A. GORDON. Microwave Signature of Thick-Target Electron Beams in Solar Flares. A. Gordon Enslie and Dean F. Smith. **279**, 882, 47-D10 (1984)
- Gas Dynamics in the Impulsive Phase of Solar Flares. I. Thick-Target Heating by Nonthermal Electrons. F. Nagai and A. Gordon Enslie. **279**, 896, 47-E10 (1984)
- ENDO, YASUKI. Laboratory Millimeter-Wave Spectrum of Iron Monoxide, FeO. Yasuki Endo, Shuji Saito, and Eizi Hirota. **278**, L131, 36-D13 (1984)
- EPSTEIN, R. I. On the Formation of Stars from Disk Accretion. J. A. Mercer-Smith, A. G. W. Cameron, and R. I. Epstein. **279**, 363, 41-A2 (1984)
- EPSTEIN, RICHARD I. Galaxies from Poisson Fluctuations. Richard I. Epstein. **281**, 545, 68-E1 (1984)
- Firm Bounds on the Neutrino Mass from the Distribution of Dark Matter in Galaxies. Jes Madsen and Richard I. Epstein. **282**, 11, 74-B2 (1984)
- ERICKSON, NEAL R. Models of Molecular Clouds. I. Multitransition Study of CS. Ronald L. Snell, Lee G. Mundy, Paul F. Goldsmith, Neal J. Evans II, and Neal R. Erickson. **276**, 625, 8-D2 (1984)
- High-Velocity Molecular Jets. Ronald L. Snell, N. Z. Scoville, D. B. Sanders, and Neal R. Erickson. **284**, 176, 100-A8 (1984)
- ESSEX, CHRISTOPHER. Minimum Entropy Production in the Steady State and Radiative Transfer. Christopher Essex. **285**, 279, 113-A5 (1984)
- ESTABROOK, FRANK B. IUE Observations of High-Redshift Quasars. Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman. **281**, 76, 61-F12 (1984)
- ESTULIN, I. V. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt. **280**, 150, 50-E14 (1984)
- On the Morphology and Spectra of the Short Gamma-Ray Bursts. C. Barat, R. J. Hayes, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zenchenko. **285**, 791, 120-B3 (1984)
- A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognost 7) Satellite Experiment. P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky. **285**, L67, 121-E10 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. **286**, L5, 126-D7 (1984)
- Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolzide. **286**, L11, 126-D14 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- EVANS, DAVID S. Chromospheric Lines in Red Dwarf Flare Stars. II. EV Lacertae, EQ Pegasi A, and V1054 Ophiuchi. Bjørn R. Pettersen, David S. Evans, and Lawrence A. Coleman. **282**, 214, 76-C4 (1984)
- The Flare Activity of AD Leonis. Bjørn R. Pettersen, Lawrence A. Coleman, and David S. Evans. **54**, 375, 7-A2 (1984) (Abstr. in **277**, 907, 22-A8)
- EVANS, NANCY REMAGE. X Cygni: Duplicity, Period Stability, and Atmospheric Velocity Structure. Nancy Remage Evans. **281**, 760, 70-G2 (1984)
- An Investigation of the Stellar Association Containing the 1.95 Day Cepheid SU Cassiopeiae. David G. Turner and Nancy Remage Evans. **283**, 254, 88-F13 (1984)
- EVANS, NEAL J., II. Models of Molecular Clouds. I. Multitransition Study of CS. Ronald L. Snell, Lee G. Mundy, Paul F. Goldsmith, Neal J. Evans II, and Neal R. Erickson. **276**, 625, 8-D2 (1984)
- Ionized Magnesium in the Planetary Nebula NGC 7027. S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant. **277**, 207, 13-B13 (1984)
- Infrared and Millimeter-Wave Observations of the Sharpless 156 Molecular Cloud. Marshall Joy, Neal J. Evans II, Paul M. Harvey, and Bruce A. Wilking. **284**, 161, 99-G5 (1984)
- EVANS, ROBERT. The 1984 Supernova in NGC 3169: Evidence for a Superwind. Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz. **287**, L69, 145-D7 (1984)
- EVANS, W. D. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt. **280**, 150, 50-E14 (1984)
- 3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz. **286**, 681, 130-E9 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. **286**, L5, 126-D7 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- EVENSON, K. M. Infrared and Far-Infrared Transition Frequencies for the CH₃ Radical. Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown. **276**, 399, 5-B7 (1984)
- The Direct Measurement of the $3^3P_0-3^3P_1$ Fine-Structure Interval and the g_J -Factor of Atomic Silicon by Laser Magnetic Resonance. Massimo Inguscio, K. M. Evenson, Virgilio Beltrán-López, and Eugenio Ley-Koo. **278**, L127, 36-D9 (1984)
- EVENSON, PAUL. Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest. **283**, 439, 90-G5 (1984)
- FABBIANO, G. An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **277**, 115, 12-B12 (1984)
- VV Puppis: The Soft X-Ray Machine. Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White. **279**, 785, 46-D3 (1984)
- X-Ray and UV Observations of Two Radio-bright Quasars. Martin Elvis and G. Fabbiano. **280**, 91, 50-A8 (1984)
- 1-20 Micron Infrared Photometry of 3CR Radio Galaxies. Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward. **280**, 514, 56-B5 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- X-Ray Observations of Spiral Galaxies. I. Integrated Properties. G. Fabbiano, G. Trinchieri, and A. Macdonald. **284**, 65, 98-E14 (1984)
- The Complex X-Ray Emission of NGC 253. G. Fabbiano and G. Trinchieri. **286**, 491, 128-D14 (1984)
- FABER, S. M. Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm. **287**, 586, 140-E5 (1984)
- FABIAN, A. C. The Mass Profile and Gas Content of M87. G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen. **278**, 536, 31-G1 (1984)
- Models of the Hard X-Ray Spectrum of AM Herculis and Implications for the Accretion Rate. J. H. Swank, A. C. Fabian, and R. R. Ross. **280**, 734, 57-G3 (1984)
- The Prevalence of Cooling Flows in Clusters of Galaxies. G. C. Stewart, A. C. Fabian, C. Jones, and W. Forman. **285**, 1, 110-A6 (1984)

- FABRICANT, D. X-Ray Measurements of the Nonspherical Mass Distribution in the Cluster of Galaxies A2256. *D. Fabricant, G. Rybicki, and P. Gorenstein*. **286**, 186, 124-A6 (1984)
- FAHEY, RICHARD P. Do Bipolar Magnetic Regions Exist on the Surfaces of Early-Type Stars? *Anne B. Underhill and Richard P. Fahey*. **280**, 712, 57-E11 (1984)
- Comparison of Variations in the Visible and Ultraviolet Spectra of a Centauri. *Richard P. Fahey*. **55**, 507, 17-F3 (1984) (Abstr. in **281**, 892, 72-C5)
- FAHLMAN, G. G. Deep CCD Photometry in Globular Clusters. I. The Main Sequence of M4. *Harvey B. Richer and G. G. Fahlman*. **277**, 227, 13-D5 (1984)
- FALCO, E. E. The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney*. **287**, 538, 140-A11 (1984)
- FAN, C. Y. Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. *B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipvach, M. Scholer, C. Y. Fan, and L. A. Fisk*. **281**, 458, 66-A1 (1984)
- FANELLI, MICHAEL N. Velocity Distribution of Virgo Cluster Galaxies. *Christi Facias, Michael N. Fanelli, and Mitchell F. Struble*. **282**, 19, 74-B10 (1984)
- FAROUKI, RIDA. Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. *Rida Farouki, Stuart L. Shapiro, and Ira Wasserman*. **284**, 282, 101-B3 (1984)
- FAUCHER, P. Analysis of Magnesium xi Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthausen, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark*. **282**, 784, 83-E13 (1984)
- FAZIO, G. G. Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. *S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley*. **279**, 162, 38-F11 (1984)
- Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. *Irene Cruz-Gonzalez, B. McBreen, and G. G. Fazio*. **279**, 679, 45-C6 (1984)
- Far-Infrared and CO Observations of the W33 Complex. *M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino*. **283**, 573, 93-B4 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. *T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen*. **286**, 573, 129-D9 (1984)
- FAZIO, GIOVANNI G. High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. *John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio*. **279**, 685, 45-C12 (1984)
- A Far-Infrared Survey of the Galactic Center. *Sten F. Odenwald and Giovanni G. Fazio*. **283**, 601, 93-D14 (1984)
- FEDERMAN, S. R. A Search for Interstellar H_2O^+ in Diffuse Clouds. *Wm. Hayden Smith, W. V. Schempp, and S. R. Federman*. **277**, 196, 13-B2 (1984)
- Observations of Narrow Diffuse Interstellar Bands toward Stars with Low Reddening. *S. R. Federman, C. K. Kumar, and P. A. Vanden Bout*. **282**, 485, 80-D9 (1984)
- A Low Density Molecular Cloud in the Vicinity of the Pleiades. *S. R. Federman and Robert F. Willson*. **283**, 626, 93-F14 (1984)
- The CN Radical in Diffuse Interstellar Clouds. *S. R. Federman, A. C. Danks, and D. L. Lambert*. **287**, 219, 135-C11 (1984)
- FEIBELMAN, WALTER A. The Remarkable Ultraviolet Spectrum of the Planetary Nebula Abell 30. *J. Patrick Harrington and Walter A. Feibelman*. **277**, 716, 20-A1 (1984)
- The Central Star of the Planetary Nebula Abell 78. *James B. Kaler and Walter A. Feibelman*. **282**, 719, 83-A1 (1984)
- IUE Observations of the "Butterfly" Nebula M2-9. *Walter A. Feibelman*. **287**, 353, 136-G1 (1984)
- FEICKERT, C. A. Quantal Calculations of Charge Transfer in Collisions between N v and Atomic Hydrogen. *C. A. Feickert, R. J. Blint, G. T. Surratt, and W. D. Watson*. **286**, 371, 126-A1 (1984)
- FEKEL, FRANCIS C. Speckle Interferometric Measurements of Binary Stars. IX. *Harold A. McAlister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel*. **54**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)
- FELDMAN, P. D. IUE Observations of Longitudinal and Temporal Variations in the Jovian Auroral Emission. *T. E. Skinner, S. T. Durranee, P. D. Feldman, and H. W. Moos*. **278**, 441, 28-F11 (1984)
- Temporal and Spatial Behavior of the Ultraviolet Emissions of Comet Iras-Araki-Alcock 1983d. *P. D. Feldman, M. F. A'Hearn, and R. L. Millis*. **282**, 799, 83-F14 (1984)
- FELDMAN, U. On the Rate of Energy Input in Thermal Solar Flares. *U. Feldman, G. A. Doschek, and D. L. McKenzie*. **276**, L53, 10-F10 (1984)
- Direct Measurement of the Increase in Altitude of the Soft X-Ray Emission Region during a Solar Flare. *J. F. Seely and U. Feldman*. **280**, L59, 60-E10 (1984)
- FELDMAN, URI. The Relation of Electron Temperature to Emission Measure and Limits of Increase in Emission Measure in Soft X-Ray Flares. *Richard E. Denton and Uri Feldman*. **286**, 359, 125-G2 (1984)
- FELLI, M. Star Formation in the M8E Region. *M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders*. **278**, 170, 25-G8 (1984)
- FELTEN, JAMES E. Milgrom's Revision of Newton's Laws: Dynamical and Cosmological Consequences. *James E. Felten*. **286**, 3, 122-A7 (1984)
- FELTHAUSER, H. Analysis of Magnesium xi Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthausen, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark*. **282**, 784, 83-E13 (1984)
- FENIMORE, E. E. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt*. **280**, 150, 50-E14 (1984)
- Analysis of Magnesium xi Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthausen, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark*. **282**, 784, 83-E13 (1984)
- 3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. *J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz*. **286**, 681, 130-E9 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch*. **286**, L5, 126-D7 (1984)
- FERGUSON, DONALD H. PG 1012 - 029: A High-Excitation Eclipsing Cataclysmic Variable. *William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green*. **276**, 233, 3-D5 (1984)
- Hot Subdwarfs in Detached Binary Systems and Thick-Disk Cataclysmic Variables from the Palomar-Green Survey. *Donald H. Ferguson, Richard F. Green, and James Liebert*. **287**, 320, 136-D10 (1984)
- FERLAND, G. J. The Line Continuum Luminosity Ratio in Active Galactic Nuclei: Or, On the "Baldwin Effect". *R. Mushotzky and G. J. Ferland*. **278**, 558, 32-A9 (1984)
- IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovak, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
- Radiation Pressure and the Stability of Broad-Line Region Clouds. *G. J. Ferland and Moshe Elitzur*. **285**, L11, 114-F11 (1984)
- Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. *G. J. Ferland and R. F. Mushotzky*. **286**, 42, 122-D4 (1984)
- FERNIE, J. D. A Survey of Cepheid Stars. *J. D. Fernie*. **282**, 641, 82-A11 (1984)
- New Results for HD 161796. *J. D. Fernie and R. F. Garrison*. **285**, 698, 119-B5 (1984)
- FERRARA, A. Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. *J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock*. **280**, 688, 57-C14 (1984)
- FERRARI, A. A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos*. **277**, L35, 22-E1 (1984)
- FERRINI, FEDERICO. Stochastic Models for the Evolution of Open Stellar Systems. *Federico Ferrini and Fabio Marchesoni*. **287**, 17, 133-B10 (1984)
- FERTEL, J. H. Io's Sodium Directional Features: Evidence for a Magnetospheric-Wind-driven Gas Escape Mechanism. *C. B. Pilcher, W. H. Smyth, M. R. Combi, and J. H. Fertel*. **287**, 427, 137-E7 (1984)
- FESEN, ROBERT A. Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. *William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull*. **279**, 708, 45-E7 (1984)
- The Nature of the Filaments Northeast of the Supernova Remnant IC 443. *Robert A. Fesen*. **281**, 658, 69-F8 (1984)
- An Optical Investigation of the Peculiar Supernova Remnant CTB 80. *William P. Blair, Robert P. Kirshner, Robert A. Fesen, and Theodore R. Gull*. **282**, 161, 75-F6 (1984)
- FICH, MICHEL. Optical H II Regions in the Outer Galaxy. *Michel Fich*

- and Leo Blitz. **279**, 125, 38-C12 (1984)
- FIEDLER, RALPH. Jet Deflection by Ram Pressure and Pressure Gradients. *Ralph Fiedler and R. N. Henriksen*. **281**, 554, 68-E10 (1984)
- MHD Kelvin-Helmholtz Instability in Extended Radio Jets. *Ralph Fiedler and T. W. Jones*. **283**, 532, 92-F1 (1984)
- FILIPPENKO, ALEXEI V. NGC 7213: A Key to the Nature of Liners? *Alexei V. Filippenko and J. P. Halpern*. **285**, 458, 116-D10 (1984)
- The Nonstellar Continuum of the Seyfert Galaxy NGC 7213. *J. P. Halpern and Alexei V. Filippenko*. **285**, 475, 116-E13 (1984)
- FILLMORE, JAMES A. Self-similar Gravitational Collapse in an Expanding Universe. *James A. Fillmore and Peter Goldreich*. **281**, 1, 61-A6 (1984)
- Self-similar Spherical Voids in an Expanding Universe. *James A. Fillmore and Peter Goldreich*. **281**, 9, 61-A14 (1984)
- FINKENTHAL, M. Electron Density-Dependent Intensity Ratios of Highly Ionized Iron Lines: A Comparison of Theory and Experiment. *B. C. Stratton, H. W. Moos, and M. Finkenthal*. **279**, L31, 42-F3 (1984)
- FISCHER, J. Star Formation in the M8E Region. *Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders*. **278**, 170, 25-G8 (1984)
- FISHER, GEORGE H. Chromospheric Evaporation Velocities in Solar Flares. *George H. Fisher, Richard C. Canfield, and Alexander N. McClymont*. **281**, L79, 73-B13 (1984)
- FISHER, R. The Sun as a Star: 1982 June 14–August 13. *R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime*. **280**, 873, 59-C11 (1984)
- Detection of a Slowly Moving Coronal Transient Event. *R. Fisher and C. Garcia*. **282**, L35, 78-C9 (1984)
- Solar Activity Cycle Variation of the K Corona. *R. Fisher and D. G. Sime*. **285**, 354, 113-F14 (1984)
- Rotational Characteristics of the White-Light Solar Corona: 1965–1983. *R. Fisher and D. G. Sime*. **287**, 959, 144-F4 (1984)
- FISHER, R. R. The Corona near the Time of the 1983 June 11 Total Solar Eclipse. *D. G. Sime, R. R. Fisher, M. K. McCabe, and D. L. Mickey*. **278**, L123, 36-C11 (1984)
- FISHER, RICHARD R. Coronal Transient Geometry. I. The Flare-associated Event of 1981 March 25. *Richard R. Fisher and Richard H. Munro*. **280**, 428, 53-E10 (1984)
- FISHER, W. A. A Radial Velocity Study of XY Leonis. *B. J. Hrivnak, E. F. Milone, G. Hill, and W. A. Fisher*. **285**, 683, 119-A4 (1984)
- FISK, L. A. Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. *B. Klecker, D. Hoestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk*. **281**, 458, 66-A1 (1984)
- FITCH, WALTER S. Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. *Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry*. **282**, 226, 76-D2 (1984)
- FITZPATRICK, EDWARD L. International Ultraviolet Explorer Observations of Stars in 30 Doradus: Extinction and Stellar Continua. *Edward L. Fitzpatrick and Blair D. Savage*. **279**, 578, 44-B10 (1984)
- Ultraviolet Interstellar Absorption toward Stars in the Small Magellanic Cloud. II. Sk 159. *Edward L. Fitzpatrick*. **282**, 436, 80-A1 (1984)
- FIX, JOHN D. A Search for O^{18}H Maser Emission from G351.8 – 0.5. *John D. Fix and Robert L. Mutel*. **283**, 653, 94-A14 (1984)
- OH Maser Emission from Warm Variable Stars. *John D. Fix and Mark J. Claussen*. **287**, L35, 138-E8 (1984)
- FLA, TOR. Fast-Mode Magnetohydrodynamic Waves in Coronal Holes and the Solar Wind. *Tor Flå, Shadia R. Habbal, Thomas E. Holzer, and Egil Leer*. **280**, 382, 53-B4 (1984)
- FLORKOWSKI, D. R. Rapid Radio Variations in the Flux Density of BL Lacertae. *K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Josties, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis*. **277**, L30, 22-D11 (1984)
- FLOWER, PHILLIP J. Ages of Intermediate-Age Magellanic Cloud Star Clusters. *Phillip J. Flower*. **278**, 582, 32-C7 (1984)
- FOING, B. On the Origin of the Discrete Character of the Solar Disk Brightness in the 160 Nanometer Continuum. *B. Foing and R. M. Bonnet*. **279**, 848, 47-B2 (1984)
- FOLTZ, C. B. The Radio Properties of the Broad Absorption-Line Quasars. *J. T. Stocke, C. B. Foltz, R. J. Weymann, and W. A. Christiansen*. **280**, 476, 55-B2 (1984)
- FOLTZ, CRAIG B. Variability of the Emission-Line Spectra and Optical Continua of Seyfert Galaxies. II. *Bradley M. Peterson, Craig B. Foltz, D. Michael Crenshaw, Karie A. Meyers, and Paul L. Byard*. **279**, 529, 43-E13 (1984)
- Improved Lower Limits on Lyman-Alpha Forest Cloud Dimensions and Additional Evidence Supporting the Gravitational Lens Nature of 2345 + 007A.B. *Craig B. Foltz, Ray J. Weymann, Hermann-Josef Röser, and Frederic H. Chaffee, Jr.* **281**, L1, 65-E2 (1984)
- FOMALONT, E. B. Limits to the Small-Scale Fluctuations in the Cosmic Background Radiation. *E. B. Fomalont, K. I. Kellermann, and J. V. Wall*. **277**, L23, 22-D4 (1984)
- Is 3C 310 Blowing Bubbles? *Wil van Breugel and E. B. Fomalont*. **282**, L55, 85-A11 (1984)
- FONTAINE, G. Carbon in the Cool DC and C_2 White Dwarfs: Dredge-up in Compositionally Stratified Envelopes. *G. Fontaine, B. Villeneuve, F. Wesemael, and G. Wegner*. **277**, L61, 22-F12 (1984)
- Diffusion-induced Hydrogen Burning in Helium-rich White Dwarfs. *G. Michaud, G. Fontaine, and Y. Charland*. **280**, 247, 51-F8 (1984)
- The Lithium Abundance: Constraints on Stellar Evolution. *G. Michaud, G. Fontaine, and G. Beaudet*. **282**, 206, 76-B10 (1984)
- Diffusion-induced Hydrogen Burning and the Evolution of DA White Dwarfs. *G. Michaud and G. Fontaine*. **283**, 787, 95-E2 (1984)
- FORD, HOLLAND. Spectrophotometry and Image Analysis of the Nebulosity around the Low-Redshift Quasar 0241 + 622. *W. Romanishin, Holland Ford, Robin Ciardullo, and Bruce Margon*. **277**, 487, 17-D5 (1984)
- FORD, V. L. Supernova Remnants in the Magellanic Clouds. *D. S. Mathewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle*. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- FORD, W. KENT, JR. Luminosity-dependent Line Ratios in Disks of Spiral Galaxies. *Vera C. Rubin, W. Kent Ford, Jr., and Bradley C. Whitmore*. **281**, L21, 65-F6 (1984)
- Stellar and Gas Kinematics in Disk Galaxies. *Bradley C. Whitmore, Vera C. Rubin, and W. Kent Ford, Jr.* **287**, 66, 133-F3 (1984)
- FORMAN, M. On the Nature of the Galactic Gamma-Ray Sources. *G. E. Morfill, M. Forman, and G. Bignami*. **284**, 856, 108-D2 (1984)
- FORMAN, W. The Structure of Clusters of Galaxies Observed with Einstein. *C. Jones and W. Forman*. **276**, 38, 1-D1 (1984)
- Clusters of Galaxies as a Probe of the Intergalactic Medium. *W. Forman, C. Jones, and W. Tucker*. **277**, 19, 11-B10 (1984)
- The Prevalence of Cooling Flows in Clusters of Galaxies. *G. C. Stewart, A. C. Fabian, C. Jones, and W. Forman*. **285**, 1, 110-A6 (1984)
- FORREST, DAVID J. Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. *Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest*. **283**, 439, 90-G5 (1984)
- FORRESTER, W. T. Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. *Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenlid*. **281**, 766, 70-G8 (1984)
- FORTE, JUAN C. A Deep Photometric Study of IC 5146. *Juan C. Forte and Ana M. Orsatti*. **56**, 211, 25-B13 (1984) (Abstr. in **284**, 869, 108-E1)
- FOUKAL, P. A Photometric Study of Heat Flow at the Solar Photosphere. *P. Foukal and L. Fowler*. **281**, 442, 65-F7 (1984)
- A Photometric Study of Heat Flow at the Solar Photosphere: Erratum. *P. Foukal and L. Fowler*. **286**, 377, 126-A7 (1984) (Orig. paper in **281**, 442, 65-F7)
- FOUKAL, P. V. A Study of Solar Photospheric Limb-Darkening Variations. *L. D. Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce*. **283**, 426, 90-F4 (1984)
- FOWLER, L. A Photometric Study of Heat Flow at the Solar Photosphere. *P. Foukal and L. Fowler*. **281**, 442, 65-F7 (1984)
- A Photometric Study of Heat Flow at the Solar Photosphere: Erratum. *P. Foukal and L. Fowler*. **286**, 377, 126-A7 (1984) (Orig. paper in **281**, 442, 65-F7)
- FOWLER, W. A. Bound-State Decay of Rhenium-187. *R. D. Williams, W. A. Fowler, and S. E. Koonin*. **281**, 363, 64-G11 (1984)
- FOX, M. W. Shock Waves in Mira Variables. I. Emission-Line Spectra. *M. W. Fox, P. R. Wood, and M. A. Dopita*. **286**, 337, 125-E8 (1984)
- FRANCO, JOSÉ. The Galaxy as a Self-regulated Star-forming System: The Case of the OB Associations. *José Franco and Steven N. Shore*. **285**, 813, 120-C13 (1984)
- FRANSSON, CLAES. A Cosmic-Ray Supported Galactic Corona. *Roger A. Chevalier and Claes Fransson*. **279**, L43, 48-A12 (1984)
- FRAQUELLI, DOROTHY A. The RS Canum Venaticorum Phenomena. I. Ha Emission in HR 1099. *Dorothy A. Fraquelli*. **276**, 243, 3-E1 (1984)
- FREEDMAN, WENDY L. On the Nonuniqueness of Self-propagating Spiral Galaxy Models. *Wendy L. Freedman and Barry F. Madore*. **280**, 592, 56-C9 (1984)
- Galactic Detonation Waves: Numerical Models Illustrating the Transition from Deterministic to Stochastic. *Wendy L. Freedman, Barry F. Madore, and Sanju Mehta*. **282**, 412, 79-E5 (1984)
- Photographic Photometry of the Open Cluster NGC 7790. *Mario Pedreros, Barry F. Madore, and Wendy L. Freedman*. **286**, 563, 129-C13 (1984)
- FREEMAN, D. E. Interstellar O_2 . II. VUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. *Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman*. **277**, 569, 18-C5 (1984)
- FREEMAN, K. C. The Anticorrelation of Cyanogen and CH on the Giant Branch of 47 Tucanae. *John Norris, K. C. Freeman, and G. S. Da Costa*. **277**, 615, 18-F10 (1984)

- The Vertical Velocity Dispersion of the Stars in the Disks of Two Spiral Galaxies. *P. C. van der Kruit and K. C. Freeman*. **278**, 81, 24-G11 (1984)
- FRESE, KATHARINE. Do Monopoles Keep White Dwarfs Hot? *Katharine Freese*. **286**, 216, 124-C8 (1984)
- FREERKING, MARGARET A. Carbon and Oxygen Isotope Fractionation in Dense Interstellar Clouds. *William D. Langer, T. E. Graedel, Margaret A. Freerking, and P. B. Armentrout*. **277**, 581, 18-D4 (1984)
- FRIEBERG, P. The Detection of Interstellar Methylcyanoacetylene. *N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarsen*. **276**, L25, 5-F14 (1984)
- High-Velocity HCO⁺ in Cepheus A: Ionization Levels in High-Density Clumps within a Molecular Flow. *Robert B. Loren, Alwyn Wootten, Aa. Sandqvist, P. Friberg, and A. Hjalmarsen*. **287**, 707, 142-A11 (1984)
- FRIEBERG, PER. The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO⁺ Flow in NGC 2071. *Alwyn Wootten, Robert B. Loren, Aage Sandqvist, Per Friberg, and Ake Hjalmarsen*. **279**, 633, 44-F14 (1984)
- FRIED, J. Host Galaxies of Quasars and Their Association with Galaxy Clusters. *T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff*. **278**, 11, 24-B2 (1984)
- FRIED, ROBERT. The 1982 Eclipse of 31 Cygni. *Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman*. **281**, 751, 70-F7 (1984)
- FRIEDJUNG, M. IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. *R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung*. **283**, 226, 88-D13 (1984)
- FRIEDMAN, H. Millisecond Variability of Cygnus X-1. *J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman*. **278**, 288, 27-B6 (1984)
- The HEAO A-1 X-Ray Source Catalog. *K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidav*. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- FRIEND, DAVID B. Winds from Rotating, Magnetic, Hot Stars. I. General Model Results. *David B. Friend and Keith B. MacGregor*. **282**, 591, 81-E3 (1984)
- FRITZ, G. 3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. *J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz*. **286**, 681, 130-E9 (1984)
- FROGEL, JAY A. The Stellar Content and Metallicity of the NGC 5128 Globular Cluster. *Jay A. Frogel*. **278**, 119, 25-C11 (1984)
- FROMMHOFF, LOTHAR. Hydrogen Dimer Structures in the Far-Infrared Spectra of Jupiter and Saturn. *Lothar Frommhold, Robert Samuelson, and George Birnbaum*. **283**, L79, 97-D14 (1984)
- FROST, K. J. The High-Energy X-Ray Spectrum of Centaurus XR-3 Observed from OSO 8. *J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig*. **278**, 266, 26-G8 (1984)
- Fast Variations in High-Energy X-Rays from Solar Flares and Their Constraints on Nonthermal Models. *Alan L. Kiplinger, B. R. Dennis, K. J. Frost, and L. E. Orwig*. **287**, L105, 145-F13 (1984)
- FRY, J. N. Galaxy N-Point Correlation Functions: Theoretical Amplitudes for Arbitrary N. *J. N. Fry*. **277**, L5, 16-A5 (1984)
- The Galaxy Correlation Hierarchy in Perturbation Theory. *J. N. Fry*. **279**, 499, 43-C11 (1984)
- Supermassive Monopole Stars. *J. N. Fry and George M. Fuller*. **286**, 397, 127-D5 (1984)
- FRYXELL, B. A. Supernovae in Cataclysmic Variable Systems and the Formation of Low-Mass X-Ray Binaries. *Ronald E. Taam and B. A. Fryxell*. **279**, 166, 38-G2 (1984)
- FTACLAS, CHRIST. Velocity Distribution of Virgo Cluster Galaxies. *Christ Ftacfas, Michael N. Fanelli, and Mitchell F. Struble*. **282**, 19, 74-B10 (1984)
- FUJIMOTO, M. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L73, 85-C6 (1984)
- FUJIMOTO, MASAYUKI Y. Thermal Evolution of Accreting Neutron Stars. *Masayuki Y. Fujimoto, Tomoyuki Hanawa, Icko Iben, Jr., and M. B. Richardson*. **278**, 813, 34-F13 (1984)
- Lateral Propagation of the Helium Shell Flash on an Accreting Neutron Star. *Toshiya Nozakura, Satoru Ikeuchi, and Masayuki Y. Fujimoto*. **286**, 221, 124-C13 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. *Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè*. **287**, 749, 142-D14 (1984)
- FUJIMOTO, Y. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L73, 85-C6 (1984)
- FUKUI, Y. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L73, 85-C6 (1984)
- FULKERSON, STUART A. The Gas Density Gradient for Three Dark Interstellar Clouds. *Stuart A. Fulkerson and Frank O. Clark*. **287**, 723, 142-B14 (1984)
- FULLER, GEORGE M. Supermassive Monopole Stars. *J. N. Fry and George M. Fuller*. **286**, 397, 127-D5 (1984)
- FURENLID, INGEMAR. Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. *Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenliid*. **281**, 766, 70-G8 (1984)
- FUSCO-FEMIANO, R. Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. *A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda*. **279**, 515, 43-D13 (1984)
- Nonequilibrium Analysis of Supernova Remnants in the Large Magellanic Cloud. *R. Fusco-Femiano and A. Preite-Martinez*. **281**, 593, 69-A13 (1984)
- FUSI PECCI, FLAVIO. On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. *Roberto Buonanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaino, and William Liller*. **277**, 220, 13-C12 (1984)
- GABRIEL, A. H. The Energetics of Chromospheric Evaporation in Solar Flares. *E. Antonucci, A. H. Gabriel, and B. R. Dennis*. **287**, 917, 144-C4 (1984)
- GAFFET, BERNARD. Stability of Self-similar Flow: Correct Form of the Basic Equations and of the Shock Boundary Conditions. *Bernard Gaffet*. **279**, 419, 41-E2 (1984)
- GALINDO-TREJO, J. MHD Stability of Sheet Equilibria Relevant for Quiescent Prominences. *J. Galindo-Trejo and K. Schindler*. **277**, 422, 15-D12 (1984)
- GALLAGHER, J. S. CO Emission from the Star-Burst Irregular Galaxy NGC 1569. *Judith S. Young, J. S. Gallagher, and Deidre A. Hunter*. **276**, 476, 6-F13 (1984)
- GALLAGHER, JOHN S., III. A Probable Supernova Remnant in the Dwarf Elliptical Galaxy NGC 185. *John S. Gallagher III, Deidre A. Hunter, and Jeremy Mould*. **281**, L63, 73-A12 (1984)
- The Families of Elliptical-like Galaxies. *Allan Wirth and John S. Gallagher III*. **282**, 85, 74-G10 (1984)
- Star Formation Histories of Irregular Galaxies. *John S. Gallagher III, Deidre A. Hunter, and Alexander V. Tutukov*. **284**, 544, 105-A12 (1984)
- GALLOWAY, D. J. Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. *A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway*. **278**, 369, 28-A6 (1984)
- GARCIA, C. Detection of a Slowly Moving Coronal Transient Event. *R. Fisher and C. Garcia*. **282**, L35, 78-C9 (1984)
- GARCIA, M. Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. *J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock*. **280**, 688, 57-C14 (1984)
- GARCIA, R. D. M. A High-Order Spherical Harmonics Solution to the Standard Problem in Radiative Transfer. *M. Benassi, R. D. M. Garcia, A. H. Karp, and C. E. Siewert*. **280**, 853, 59-B5 (1984)
- GARCIA-MUNOZ, M. The Path-Length Distribution for Galactic Cosmic-Ray Propagation: An Energy-Dependent Depletion of Short Path Lengths. *M. Garcia-Munoz, T. G. Guzik, J. A. Simpson, and J. P. Wefel*. **280**, L13, 54-D4 (1984)
- GARDEN, RON. Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin*. **284**, 118, 99-D1 (1984)
- GARMANY, C. D. Mass Loss in O-Type Stars: Parameters Which Affect It. *C. D. Garmany and P. S. Conti*. **284**, 705, 106-F8 (1984)

- GARMANY, CATHARINE D. Absolute Spectrophotometry of Wolf-Rayet Stars from 1200 to 7000 Å: A Cautionary Tale. *Catharine D. Garmany, Philip Massey, and Peter S. Conti*. **278**, 233, 26-E3 (1984)
- GARMIRE, G. P. Observations of Quasi-coherent Soft X-Ray Oscillations in U Gem and SS Cygni. *F. A. Cordova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire*. **278**, 739, 34-A9 (1984)
- GARMIRE, GORDON. XUV Observations of Capella and the Local Interstellar Medium. *Norman Bobroff, John Nousek, and Gordon Garmire*. **277**, 678, 19-E3 (1984)
- GARMIRE, GORDON P. X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. *John J. Nugent, Steven H. Pravo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler*. **284**, 612, 105-F13 (1984)
- GARRISON, R. F. CPD -48°1577: The Brightest Known Cataclysmic Variable. *R. F. Garrison, R. E. Schild, W. A. Hiltner, and W. Krzeminski*. **276**, L13, 5-E13 (1984)
- New Results for HD 161796. *J. D. Fernie and R. F. Garrison*. **285**, 698, 119-B5 (1984)
- GASKELL, C. M. Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. *David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm*. **287**, 586, 140-E5 (1984)
- GASKELL, C. MARTIN. Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. *E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin*. **276**, 403, 6-A5 (1984)
- GASTON, BARBARA J. Speckle Interferometric Measurements of Binary Stars. IX. *Harold A. McAlister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel*. **284**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)
- GATLEY, I. The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. *S. Beckwith, S. C. Beck, and I. Gatley*. **280**, 648, 57-A1 (1984)
- GATLEY, IAN. Observations of Infrared Hydrogen Recombination Line Emission from External Galaxies. *S. C. Beck, S. Beckwith, and Ian Gatley*. **279**, 563, 44-A9 (1984)
- Observations of the Brightness Profile of the Sun in the 30-200 Micron Continuum. *C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley*. **281**, 862, 71-G11 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin*. **284**, 118, 99-D1 (1984)
- Ongoing Star Formation in NGC 3310: An Infrared Perspective. *C. M. Telesco and Ian Gatley*. **284**, 557, 105-B12 (1984)
- GAUTIER, D. The Helium Abundance of Saturn from Voyager Measurements. *B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein*. **282**, 807, 83-G8 (1984)
- The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager IRIS Spectra: NH_3 , PH_3 , C_2H_2 , C_2H_4 , CH_3D , CH_4 , and the Saturnian D/H Isotopic Ratio. *R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel*. **287**, 899, 144-A14 (1984)
- GAUTIER, T. N. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olson, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. *M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker*. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. *M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker*. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius*. **278**, L19, 29-D8 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. *C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young*. **278**, L45, 29-F3 (1984)
- IRAS Images of the Galactic Center. *T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden*. **278**, L57, 29-G4 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). *E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier*. **278**, L75, 30-C9 (1984)
- GEAR, W. K. Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radostitz*. **280**, 102, 50-B7 (1984)
- GEHALLE, T. R. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult*. **276**, 533, 7-D4 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin*. **284**, 118, 99-D1 (1984)
- Brackett-Alpha Line Profiles of Young Stellar Objects. *S. E. Persson, T. R. Geballe, Peter J. McGregor, Suzan Edwards, and Carol J. Lonsdale*. **286**, 289, 125-A14 (1984)
- GEBBIE, KATHARINE B. Frequent Ultraviolet Brightenings Observed in a Solar Active Region with Solar Maximum Mission. *Jason G. Porter, Juri Toomre, and Katharine B. Gebbie*. **283**, 879, 96-D14 (1984)
- GEHRELS, N. The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury*. **278**, 112, 25-C4 (1984)
- GEHREN, T. Host Galaxies of Quasars and Their Association with Galaxy Clusters. *T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff*. **278**, 11, 24-B2 (1984)
- GEHRZ, R. D. An Infrared Spatial Study of the Planetary Nebula BD +30°3639. *A. F. Bentley, J. A. Hackwell, G. L. Grasdale, and R. D. Gehrz*. **278**, 665, 33-B14 (1984)
- GEHRZ, ROBERT D. The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. *Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr.* **281**, 303, 64-C1 (1984)
- GEISLER, DOUGLAS. Magnesium, Silicon, and Iron Abundances and the Cluster Metallicity Scale. *Douglas Geisler*. **287**, L85, 145-E9 (1984)
- GELDZAHLER, B. J. Rapid Radio Variations in the Flux Density of BL Lacertae. *K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Jostes, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis*. **277**, L30, 22-D11 (1984)
- High-Resolution Observations of the Steep Spectrum Source 2147 +145. *W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Baath, and J. Romney*. **277**, L41, 22-E6 (1984)
- V LBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. *W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanromá, and A. Rius*. **286**, 503, 128-E13 (1984)
- GELDZAHLER, BARRY J. Very High Resolution Observations of Compact Sources in the Direction of Supernova Remnants: G74.87 +1.22. *Barry J. Geldzahler, David B. Shaffer, and Helmut Kühr*. **286**, 284, 125-A9 (1984)
- GELLER, M. J. The Morphology-Density Relation: The Group Connection. *M. Postman and M. J. Geller*. **281**, 95, 62-A6 (1984)
- Groups of Galaxies. III. The CfA Survey: Erratum. *M. J. Geller and J. P. Huchra*. **54**, 442, 7-F13 (1984) (Orig. paper in **52**, 61, 10-A2)
- GELLER, MARGARET J. Constraints on the Anisotropy of the Velocity Dispersion of the Coma Cluster. *Carlton Pryor and Margaret J. Geller*. **278**, 457, 31-A5 (1984)
- Seven Poor Clusters of Galaxies. *Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis*. **283**, 33, 86-D3 (1984)
- How to Find Galaxies at High Redshift. *Lee W. Hartmann, John P. Huchra, and Margaret J. Geller*. **287**, 487, 139-D13 (1984)
- The Shane-Wirtanen Counts. *Margaret J. Geller, Valerie de Lapparent, and Michael J. Kurtz*. **287**, L55, 145-C2 (1984)
- GENZEL, R. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. *R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey*. **276**, 551, 7-E9 (1984)
- Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. *Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and J. W. V. Storey*. **279**, L1, 42-D3 (1984)
- The Kleinmann-Low Nebula: An Infrared Cavity. *C. G. Wynn-Williams, R. Genzel, E. E. Becklin, and D. Downes*. **281**, 172, 62-F14 (1984)
- Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. *M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson*. **282**, L81, 85-C12 (1984)
- GERBAL, D. Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. *G. Des Forêts, R. Dominguez-*

- Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solè. **280**, 15, 49-B9 (1984)
- GERHARDY, P. Limits on Astrophysical ν Flux at $E_\gamma > 10^{19}$ eV. R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardy, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck. **281**, L9, 65-E10 (1984)
- GERHARDY, P. R. First Observation of Gamma-Rays from Vela X-1 at Energies Greater than 3×10^{15} eV. R. J. Protheroe, R. W. Clay, and P. R. Gerhardy. **280**, L47, 60-D10 (1984)
- GEZARI, D. Y. Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^\circ$ to $l = +62^\circ$: Structure and Energetics of the Inner Disk. M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung. **285**, 74, 110-F14 (1984)
- GHIGLIA, DENNIS C. Radio Jets in Classical Double Radio Sources with Strong Cores. Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia. **283**, 515, 92-D12 (1984)
- GIAMPAPA, MARK S. The Response of Chromospheric Emission Lines to Flares on YZ Canis Minoris. Simon P. Worden, Timothy J. Schneberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram. **276**, 270, 3-F14 (1984)
- Lithium Abundances and Chromospheric Activity. I. Empirical Results. Mark S. Giampapa. **277**, 235, 13-D13 (1984)
- New Spectrophotometry of the Extremely Cool Proper Motion Star LHS 2924. James Liebert, Todd A. Boroson, and Mark S. Giampapa. **282**, 758, 83-C13 (1984)
- The Appearance of Magnetic Flux on the Surfaces of the Early Main-Sequence F Stars. Mark S. Giampapa and Robert Rosner. **286**, L19, 126-E7 (1984)
- GIEREN, WOLFGANG. Surface Brightness Radii, Distances, and Absolute Magnitudes of Classical Cepheids. Wolfgang Gieren. **282**, 650, 82-B8 (1984)
- GIES, D. R. A Search for Periods Longer than 5.6 Days in the Optical Spectrum of HDE 226868 = Cygnus X-1. D. R. Gies and C. T. Bolton. **276**, L17, 5-F7 (1984)
- GIL, SALVADOR. On the Half-Life of ^{180}Ta in Stellar Environments. Eric B. Norman, Stephen E. Kellogg, Timothy Bertram, Salvador Gil, and Peter Wong. **281**, 360, 64-G8 (1984)
- GILDEN, DAVID L. Clump Collisions in Molecular Clouds: Gravitational Instability and Coalescence. David L. Gilden. **279**, 335, 40-F2 (1984)
- Thermal Instability in Molecular Clouds. David L. Gilden. **283**, 679, 94-D1 (1984)
- Gravitational Radiation from Colliding Compact Stars: Hydrodynamical Calculations in Two Dimensions. David L. Gilden and Stuart L. Shapiro. **287**, 728, 142-C5 (1984)
- GILLET, F. C. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- Far-Infrared Observations of the Crab Nebula. P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olmon. **278**, L29, 29-E3 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- GILMAN, PAMELA I. Rotation of the Sun Measured from Mount Wilson White-Light Images. Robert Howard, Peter A. Gilman, and Pamela I. Gilman. **283**, 373, 90-A11 (1984)
- GILMAN, PETER A. Rotation of the Sun Measured from Mount Wilson White-Light Images. Robert Howard, Peter A. Gilman, and Pamela I. Gilman. **283**, 373, 90-A11 (1984)
- Variations in Solar Rotation with the Sunspot Cycle. Peter A. Gilman and Robert Howard. **283**, 385, 90-B14 (1984)
- Techniques for Detecting Giant Cells Using Spatially Resolved Solar Velocity Data. Timothy M. Brown and Peter A. Gilman. **286**, 804, 131-G9 (1984)
- GIOIA, I. M. 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccacaro. **277**, 43, 11-D6 (1984)
- GIOIA, ISABELLA M. X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. Tommaso Maccacaro, Isabella M. Gioia, and John T. Stocke. **283**, 486, 92-B6 (1984)
- The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N -Log S . Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub. **283**, 495, 92-C1 (1984)
- On the Surface Density of X-Ray Selected BL Lacertae Objects. Tommaso Maccacaro, Isabella M. Gioia, Dario Maccagni, and John T. Stocke. **284**, L23, 109-A6 (1984)
- GIOMMI, P. X-Ray Variability of Quasars. G. Zamorani, P. Giommi, T. Maccacaro, and H. Tananbaum. **278**, 28, 24-C11 (1984)
- GIULIANI, J. L., JR. Thermal Evaporation of Spherical Clouds: Effects of Viscous Stresses. B. T. Draine and J. L. Giuliani, Jr. **281**, 690, 70-A13 (1984)
- GIULIANI, JOHN L., JR. On the Dynamics in Evaporating Cloud Envelopes. John L. Giuliani, Jr. **277**, 605, 18-E14 (1984)
- GIURICIN, G. N-Body Simulations of Small Groups of Galaxies. G. Giuricin, F. Mardrossian, M. Mezzetti, and P. Santangelo. **277**, 38, 11-D1 (1984)
- The Period Distribution of Unevolved Close Binary Systems. G. Giuricin, F. Mardrossian, and M. Mezzetti. **54**, 421, 7-E5 (1984) (Abstr. in **277**, 908, 22-A9)
- GLACUM, W. NGC 2024: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein. **280**, 154, 50-F5 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper. **284**, 597, 105-E12 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum. **286**, 302, 125-C1 (1984)
- GLASSGOLD, A. E. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- CN and C_2H in IRC +10216. P. J. Huggins, A. E. Glassgold, and Mark Morris. **279**, 284, 40-B5 (1984)
- GLENDENNING, B. An Atlas of QSO Luminosity Profiles. J. B. Hutchings, D. Crampton, B. Campbell, D. Duncan, and B. Glendenning. **55**, 319, 15-C4 (1984) (Abstr. in **280**, 940, 60-B4)
- GLINER, ERAST B. Combined Effect of Potential and Nonpotential Magnetic Fields on Equilibrium in Stellar Atmospheres. Erast B. Gliner. **283**, 363, 90-A1 (1984)
- Theoretical Model of the Solar Corona during Sunspot Minimum. I. Quasi-static Approximation. Vladimir A. Osheerovich, Israel Tzur, and Erast B. Gliner. **284**, 412, 102-D7 (1984)
- GLOECKLER, G. Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. G. M. Mason, G. Gloeckler, and D. Hovestadt. **280**, 902, 59-E14 (1984)
- Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk. **281**, 458, 66-A1 (1984)
- Ionic Charge State Measurements during He^+ -rich Solar Particle Events. D. Hovestadt, G. Gloeckler, B. Klecker, and M. Scholer. **281**, 463, 66-A6 (1984)
- Survey of $\text{He}^+/\text{He}^{2+}$ Abundance Ratios in Energetic Particle Events.

- D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer. **282**, L39, 78-C12 (1984)
- GOEBEL, J. Absorption Features in the 5–8 Micron Spectra of Protostars. A. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, d'Hendecourt, and F. C. Witteborn. **287**, 697, 142-A1 (1984)
- GOEBEL, J. H. The H⁻ Flux Peak and the Hydrogen Abundance in N Type Carbon Stars. J. H. Goebel and H. R. Johnson. **284**, L39, 109-B9 (1984)
- GOETT, STEPHEN J. Inner Shell Excitation of Lithium-like Ions. Stephen J. Goett, Douglas H. Sampson, and Robert E. H. Clark. **54**, 115, 2-E2 (1984) (Abstr. in **275**, 928, 147-F1)
- GOICOECHEA, L. J. Some Observable Effects in Relativistic Cosmology with Non-Perfect Fluids. L. J. Goicoechea and J. L. Sanz. **286**, 392, 127-C14 (1984)
- GOLDEN, R. L. A Measurement of the Absolute Flux of Cosmic-Ray Electrons. R. L. Golden, B. G. Mauger, G. D. Badwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse. **287**, 622, 141-A6 (1984)
- GOLDBABER, D. M. Silane in IRC +10216. D. M. Goldhaber and A. L. Betz. **279**, L55, 48-B12 (1984)
- GOLDMAN, I. Testing the Strong Equivalence Principle by Radio Ranging. V. M. Canuto, I. Goldman, and I. I. Shapiro. **276**, 1, 1-A6 (1984)
- A Formula for the Shakura-Sunyaev Turbulent Viscosity Parameter. V. M. Canuto, I. Goldman, and O. Hubickyj. **280**, L55, 60-E6 (1984)
- GOLDREICH, PETER. Self-similar Gravitational Collapse in an Expanding Universe. James A. Fillmore and Peter Goldreich. **281**, 1, 61-A6 (1984)
- Self-similar Spherical Voids in an Expanding Universe. James A. Fillmore and Peter Goldreich. **281**, 9, 61-A14 (1984)
- Excitation of Inclinations in Ring-Satellite Systems. Nicole Borderies, Peter Goldreich, and Scott Tremaine. **284**, 429, 102-E10 (1984)
- GOLDSMITH, PAUL F. Models of Molecular Clouds. I. Multitransition Study of CS. Ronald L. Snell, Lee G. Mundy, Paul F. Goldsmith, Neal J. Evans II, and Neal R. Erickson. **276**, 625, 8-D2 (1984)
- The Molecular Cloud Associated with the Infrared Source GL 437. Richard Arquilla and Paul F. Goldsmith. **279**, 664, 45-B5 (1984)
- Structure of the L1535 Dark Cloud and the Velocity Field in the Taurus Molecular Complex. Paul F. Goldsmith and Michael F. Sernyak, Jr. **283**, 140, 87-E7 (1984)
- Bipolar Outflows in Dark Clouds. Paul F. Goldsmith, Ronald L. Snell, Mark Hemon-Heyer, and William D. Langer. **286**, 599, 129-F7 (1984)
- GOLDSTEIN, S. J., JR. Double Faraday Rotation toward 3C 27. S. J. Goldstein, Jr. and J. A. Reed. **283**, 540, 92-F9 (1984)
- GOLUB, L. Einstein Observations of X-Ray Emission from A Stars: Erratum. L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr. **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana. **281**, 815, 71-D5 (1984)
- GOMBOSI, T. I. The Friable Sponge Model of a Cometary Nucleus. M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Koraszewski, K. Keszemetyi, A. F. Nagy, and K. Szego. **278**, 449, 28-G5 (1984)
- GONDHALEKAR, P. M. IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovak, P. M. Gondhalekar, and J. W. Truran. **281**, 194, 63-A12 (1984)
- GONZALO, I. On the Excitation of CH Microwave Lines. V. Bujarabail, I. Gonzalo, and F. Salinas. **285**, 312, 113-C10 (1984)
- GOODMAN, JEREMY. Core Collapse with Strong Encounters: Erratum. Jeremy Goodman. **278**, 893, 35-E11 (1984) (Orig. paper in **270**, 700, 85-F10)
- Homologous Evolution of Stellar Systems after Core Collapse. Jeremy Goodman. **280**, 298, 52-C4 (1984)
- GOODRICH, BRETT D. Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. Myron A. Smith, Walter S. Fitch, John L. Africano, Brett D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry. **282**, 226, 76-D2 (1984)
- The FK Comae Candidate UZ Librae. Bernard W. Bopp, Brett D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley. **285**, 202, 112-B8 (1984)
- GORENSTEIN, M. V. The Milli-arcsecond Images of Q0957 + 561. M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney. **287**, 538, 140-A11 (1984)
- GORENSTEIN, MARC V. A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Ruiz. **284**, 519, 104-G1 (1984)
- GORENSTEIN, P. X-Ray Measurements of the Nonspherical Mass Distribution in the Cluster of Galaxies A2256. D. Fabricant, G. Rybicki, and P. Gorenstein. **286**, 186, 124-A6 (1984)
- GOTT, RICHARD J., III. The Statistics of Gravitational Lenses: The Distributions of Image Angular Separations and Lens Redshifts. Edwin L. Turner, Jeremiah P. Ostriker, and Richard J. Gott III. **284**, 1, 98-A6 (1984)
- GOTTESMAN, S. T. High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley. **286**, 471, 128-C3 (1984)
- GOUQUENHEIM, L. The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. L. Bottinelli, L. Gouguenheim, G. Paturel, and G. de Vaucouleurs. **280**, 34, 49-C14 (1984)
- GOULD, ROBERT J. The Cross Section for Double Compton Scattering. Robert J. Gould. **285**, 275, 113-A1 (1984)
- GOUPIL, MARIE-JO. Amplitude Equations for Nonadiabatic Nonlinear Stellar Pulsators. I. The Formalism. J. Robert Buchler and Marie-Jo Goupil. **279**, 384, 41-C5 (1984)
- GRADY, C. A. Line Profile Variation in δ Orionis A, ϵ Orionis A, and 15 Monocerotis. C. A. Grady, T. P. Snow, and W. C. Cash. **283**, 218, 88-D4 (1984)
- GRAEDEL, T. E. Carbon and Oxygen Isotope Fractionation in Dense Interstellar Clouds. William D. Langer, T. E. Graedel, Margaret A. Frerking, and P. B. Armentrout. **277**, 581, 18-D4 (1984)
- GRAF, P. The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf. **287**, L15, 138-D1 (1984)
- GRAHAM, D. A. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth. **279**, 116, 38-C3 (1984)
- GRANIK, ALECK. Generation of Coronal Electric Currents Due to Convective Motions on the Photosphere. II. Resonance and Phase-Mixing of Alfvén Waves. Takashi Sakurai and Aleck Granik. **277**, 404, 15-C8 (1984)
- GRASDALEN, G. L. Massive Star Formation in NGC 6946. K. DeGioia-Eastwood, G. L. Grasdalen, S. E. Strom, and K. M. Strom. **278**, 564, 32-B1 (1984)
- An Infrared Spatial Study of the Planetary Nebula BD +30°3639. A. F. Bentley, J. A. Hackwell, G. L. Grasdalen, and R. D. Gehrz. **278**, 665, 33-B14 (1984)
- GRASDALEN, GARY L. The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. Robert D. Gehrz, Edward P. Ney, Gary L. Grasdalen, John A. Hackwell, and Harley A. Thronson, Jr. **281**, 303, 64-C1 (1984)
- High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. Gary L. Grasdalen, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castellet. **283**, L57, 97-C6 (1984)
- GRAUER, ALBERT D. Evidence for Rapid Optical Variations of the Quasistellar Radio Source 4C 29.45. Albert D. Grauer. **277**, 77, 11-F14 (1984)
- The Pulsating Central Star of the Planetary Nebula Kohoutek 1-16. Albert D. Grauer and Howard E. Bond. **277**, 211, 13-C3 (1984)
- Two New Extremely Hot Pulsating White Dwarfs. Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert. **279**, 751, 46-A10 (1984)
- GRAY, DAVID F. Measurements of Zeeman Broadening in F, G, and K Dwarfs. David F. Gray. **277**, 640, 19-A13 (1984)
- Measurements of Rotation and Turbulence in F, G, and K Dwarfs. David F. Gray. **281**, 719, 70-D3 (1984)
- GREEN, R. F. The Kinematics of the Narrow-Line Region in Active Galaxies and Quasars. III. Correlations with the Broad-Line Region and Radio Emission. T. M. Heckman, G. K. Miley, and R. F. Green. **281**, 525, 68-C9 (1984)
- GREEN, RICHARD F. PG 1012 - 029: A High-Excitation Eclipsing Cataclysmic Variable. William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green. **276**, 233, 3-D5 (1984)
- Two New Extremely Hot Pulsating White Dwarfs. Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert. **279**, 751, 46-A10 (1984)
- An Imaging Survey of Fields around Quasars. II. The Association of Galaxies with Quasars. H. K. C. Yee and Richard F. Green. **280**, 79, 49-G10 (1984)
- The Close Binary Central Star of the Planetary Nebula Abell 41: A Helium-rich Subdwarf Primary. Richard F. Green, James Liebert, and F. Wesemael. **280**, 177, 51-A1 (1984)
- Splitting of C IV Lines in a QSO Absorption-Line System. D. G. York, Richard F. Green, Jill Bechtold, and Frederic H. Chaffee, Jr. **280**, L1, 54-C2 (1984)

- IUE* Observations of High-Redshift Quasars. *Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman.* **281**, 76, 61-F12 (1984)
- Hot Subdwarfs in Detached Binary Systems and Thick-Disk Cataclysmic Variables from the Palomar-Green Survey. *Donald H. Ferguson, Richard F. Green, and James Liebert.* **287**, 320, 136-D10 (1984)
- An Imaging Survey of Fields around Quasars. I. A Catalog. *Richard F. Green and H. K. C. Yee.* **54**, 495, 8-E5 (1984) (Abstr. in **278**, 895, 35-E13)
- GREEN, S. Observations of Comet IRAS-Araki-Alcock 1983d. *R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer.* **278**, L11, 29-C14 (1984)
- GREEN, SHELTON. Metastability of Isoformyl Ions in Collisions with Helium and Hydrogen. *Sheldon Green.* **277**, 900, 22-A1 (1984)
- GREENBERG, J. MAYO. Interstellar Polarization, Grain Growth, and Alignment: Erratum. *Per A. Aannestad and J. Mayo Greenberg.* **278**, 893, 35-E11 (1984) (Orig. paper in **272**, 551, 107-G6)
- GREENSTEIN, JESSE L. Spectrophotometry of the White Dwarfs. *Jesse L. Greenstein.* **276**, 602, 8-B6 (1984)
- The Identification of Hydrogen in Grw +70°8247. *Jesse L. Greenstein.* **281**, L47, 67-A1 (1984)
- GREGORY, P. C. Two-Frequency Radio Spectra during the Outburst of the Periodic Radio Star LSI +61°303. *A. R. Taylor and P. C. Gregory.* **283**, 273, 89-A6 (1984)
- GREGORY, STEPHEN. The Variable Component of the NGC 4151 *IUE* Spectrum: Evidence for an Expanding Spherical Emission Shell. *Ronald Stoner, Roger Ptak, and Stephen Gregory.* **285**, 69, 110-F9 (1984)
- GREGORY, STEPHEN A. The A2197 and A2199 Galaxy Clusters. *Stephen A. Gregory and Laird A. Thompson.* **286**, 422, 127-F4 (1984)
- GREISEN, ERIC W. A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. *Y. Matsui, Knox S. Long, John R. Dickel, and Eric W. Greisen.* **287**, 295, 136-B9 (1984)
- GREVESSE, N. The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. *A. J. Sawal, N. Grevesse, J. W. Brault, G. M. Stokes, and R. Zander.* **282**, 330, 77-D9 (1984)
- GRIESINGER, H. E. Interstellar O_2 . ILVUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. *Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman.* **277**, 569, 18-C5 (1984)
- GRIFFIN, M. J. Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radostitz.* **280**, 102, 50-B7 (1984)
- GRIFFITHS, R. E. X-Ray Emission from M82. *M. G. Watson, V. Stanger, and R. E. Griffiths.* **286**, 144, 123-D12 (1984)
- GRINDLAY, J. E. Optical Identification of 2S 1417 - 62. *J. E. Grindlay, L. D. Petro, and J. E. McClintock.* **276**, 621, 8-C11 (1984)
- The Central X-Ray Source in SS 433. *J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall.* **277**, 286, 14-A13 (1984)
- X-Ray Observations of X Persei. *M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Narayan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland.* **278**, 711, 33-F5 (1984)
- Short-Term X-Ray Variability of the Globular Cluster Source 4U 1820 - 30 (NGC 6624). *L. Stella, S. M. Kahn, and J. E. Grindlay.* **282**, 713, 82-G4 (1984)
- Determination of the Mass of Globular Cluster X-Ray Sources. *J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman.* **282**, L13, 78-A13 (1984)
- GRINDLAY, JONATHAN E. The *Einstein* Galactic Plane Survey: Statistical Analysis of the Complete X-Ray Sample. *Paul Hertz and Jonathan E. Grindlay.* **278**, 137, 25-E3 (1984)
- Evidence for Weak X-Ray Burst Emission from Cygnus X-2 and GX 17 + 2. *Steven M. Kahn and Jonathan E. Grindlay.* **281**, 826, 71-E3 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. *Paul Hertz and Jonathan E. Grindlay.* **282**, 118, 75-C2 (1984)
- On the Origin of X-Ray Variability of SS 433. *David L. Band and Jonathan E. Grindlay.* **285**, 702, 119-B11 (1984)
- GRUBER, D. E. SMC X-1 Variability Observed from *HEAO 1*. *D. E. Gruber and R. E. Rothschild.* **283**, 546, 92-G1 (1984)
- The *HEAO 1* A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primi, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson.* **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- GRY, C. The Correlation of Interstellar Element Depletions with Mean Gas Density. *A. W. Harris, C. Gry, and G. E. Bromage.* **284**, 157, 99-G1 (1984)
- GUENTHER, D. B. Resonant Three-Wave Interactions of Solar g-Modes. *D. B. Guenther and P. Demarque.* **277**, L17, 16-B3 (1984)
- GUILLORY, JOHN. The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. *William K. Rose, John Guillory, James H. Beall, and Selig Kainer.* **280**, 550, 55-G8 (1984)
- GUINAN, E. F. *IUE* Spectrophotometry of the DA4 Primary in the Short-Period White Dwarf-Red Dwarf Spectroscopic Binary Case 1. *E. M. Sion, F. Wesemael, and E. F. Guinan.* **279**, 758, 46-B3 (1984)
- Ultraviolet Flare on Lambda Andromedae. *S. L. Baliunas, E. F. Guinan, and A. K. Dupree.* **282**, 733, 83-B1 (1984)
- GUINAN, EDWARD F. The Morphology of a Mass Loss Episode of the Be Star ω Orionis. *Daniel P. Hayes and Edward F. Guinan.* **279**, 721, 45-F8 (1984)
- Einstein* Observations of Selected Close Binaries and Shell Stars. *Edward F. Guinan, Robert H. Koch, and Mirek J. Plavec.* **282**, 667, 82-C11 (1984)
- The Abrupt Onset of a Major ω Orionis Mass Loss Episode. *Edward F. Guinan and Daniel P. Hayes.* **287**, L39, 138-E11 (1984)
- GULL, G. E. Detection of the [Ne III] 36 Micron Line in the Planetary Nebula NGC 6543. *M. A. Shure, J. R. Houck, G. E. Gull, and T. Herter.* **281**, L29, 65-G1 (1984)
- The Electron Density in M82 from the S III Mid-Infrared Line Ratio. *J. R. Houck, M. A. Shure, G. E. Gull, and T. Herter.* **287**, L11, 138-C12 (1984)
- The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. *T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf.* **287**, L15, 138-D1 (1984)
- GULL, T. R. *IUE* and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti.* **278**, 124, 25-D2 (1984)
- GULL, THEODORE R. Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. *William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull.* **279**, 708, 45-E7 (1984)
- Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. *Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes.* **280**, 615, 56-E7 (1984)
- An Optical Investigation of the Peculiar Supernova Remnant CTB 80. *William P. Blair, Robert P. Kirshner, Robert A. Fesen, and Theodore R. Gull.* **282**, 161, 75-F6 (1984)
- GUNKLER, TODD A. The Ha Spectral Signatures of Solar Flare Nonthermal Electrons, Conductive Flux, and Coronal Pressure. *Richard C. Canfield, Todd A. Gunkler, and Paul J. Ricchiazzi.* **282**, 296, 77-B3 (1984)
- A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. *Todd A. Gunkler, Richard C. Canfield, Loren W. Acton, and Alan L. Kiplinger.* **285**, 835, 120-E7 (1984)
- GURMAN, J. B. Linear Models of Acoustic Waves in Sunspot Umbrae. *J. B. Gurman and J. W. Leibacher.* **283**, 859, 96-C8 (1984)
- GUZIK, T. G. The Path-Length Distribution for Galactic Cosmic-Ray Propagation: An Energy-Dependent Depletion of Short Path Lengths. *M. Garcia-Munoz, T. G. Guzik, J. A. Simpson, and J. P. Wefel.* **280**, L13, 54-D4 (1984)
- HABBAL, S. R. A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos.* **277**, L35, 22-E1 (1984)
- HABBAL, SHADIA R. Fast-Mode Magnetohydrodynamic Waves in Coronal Holes and the Solar Wind. *Tor Fla, Shadia R. Habbal, Thomas E. Holzer, and Egil Leer.* **280**, 382, 53-B4 (1984)
- HABING, H. J. The *Infrared* Astronomical Satellite (*IRAS*) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young.* **278**, L1, 29-C3 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius.* **278**, L19, 29-D8 (1984)
- IRAS* Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius.* **278**, L33, 29-E7 (1984)
- IRAS* Observations of OH/IR Stars. *F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch.* **278**, L41, 29-E13 (1984)
- The Formation of Solar Type Stars: *IRAS* Observations of the Dark Cloud Barnard 5. *C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier,*

- F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- Infrared Emission from M31. H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer. **278**, L59, 30-A1 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- HACKING, G. The Remarkable Infrared Galaxy Arp 220 = IC 4553. B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson. **283**, L1, 91-E3 (1984)
- HACKNEY, K. R. Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- HACKNEY, K. R. H. Variability of the Ultraviolet Spectrum of BL Lacertae Objects. M. H. Ulrich, K. R. H. Hackney, R. L. Hackney, and Y. Kondo. **276**, 466, 6-F2 (1984)
- HACKNEY, R. L. Variability of the Ultraviolet Spectrum of BL Lacertae Objects. M. H. Ulrich, K. R. H. Hackney, R. L. Hackney, and Y. Kondo. **276**, 466, 6-F2 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- HACKWELL, J. A. An Infrared Spatial Study of the Planetary Nebula BD +30°3639. A. F. Bentley, J. A. Hackwell, G. L. Grasdale, and R. D. Gehrz. **278**, 665, 33-B14 (1984)
- HACKWELL, JOHN A. The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr. **281**, 303, 64-C1 (1984)
- HAGEN, WENDY. The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- Luminosities and Mass-Loss Rates of OH/H₂O Maser Stars. P. F. Bowers and Wendy Hagen. **285**, 637, 118-E12 (1984)
- HAGYARD, M. J. A Case for Submergence of Magnetic Flux in a Solar Active Region. Douglas Rabin, Ronald Moore, and M. J. Hagyard. **287**, 404, 137-C12 (1984)
- HALBEDEL, W. Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry. **282**, 226, 76-D2 (1984)
- HALL, DONALD N. B. An Atlas of Late-Type Stellar Spectra, 2400–2778 Inverse Centimeters. Stephen T. Ridgway, Duane F. Carbon, Donald N. B. Hall, and Jack Jewell. **54**, 177, 4-A2 (1984) (Abstr. in **276**, 798, 10-B10)
- Time Series Infrared Spectroscopy of Mira Variables. II. CO $\delta_e = 3$ in Eight Mira Variables and One SRA Variable. Kenneth H. Hinkle, Werner W. G. Scharlach, and Donald N. B. Hall. **56**, 1, 22-A2 (1984) (Abstr. in **283**, 905, 96-F12)
- HALPERN, J. P. Variable X-Ray Absorption in the QSO MR 2251 – 178. J. P. Halpern. **281**, 90, 62-A1 (1984)
- NGC 7213: A Key to the Nature of Liners? Alexei V. Filippenko and J. P. Halpern. **285**, 458, 116-D10 (1984)
- The Nonstellar Continuum of the Seyfert Galaxy NGC 7213. J. P. Halpern and Alexei V. Filippenko. **285**, 475, 116-E13 (1984)
- HALSEY, G. W. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. S. J. Daunt, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault. **280**, 921, 59-G9 (1984)
- HAMABE, MASARU. A Surface Photometry of Edge-on Galaxies. V. The Vertical Structure of the Bar in NGC 4762. Ken-ichi Wakamatsu and Masaru Hamabe. **56**, 283, 26-B3 (1984) (Abstr. in **284**, 870, 108-E2)
- HAMEURY, J. M. The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury. **278**, 112, 25-C4 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes. **279**, 177, 39-A1 (1984)
- HAMILTON, A. J. S. A New Similarity Solution for Reverse Shocks in Supernova Remnants. A. J. S. Hamilton and C. L. Sarazin. **281**, 682, 70-A5 (1984)
- X-Ray Emission from Supernova Remnants. II. The Effect of Remnant Structure on Nonequilibrium X-Ray Spectra. A. J. S. Hamilton and C. L. Sarazin. **284**, 601, 105-F2 (1984)
- Heating and Cooling in Reverse Shocks into Pure Heavy-Element Supernova Ejecta. A. J. S. Hamilton and C. L. Sarazin. **287**, 282, 136-A10 (1984)
- HAMILTON, ANDREW J. S. Thermodynamics and Galaxy Clustering: Non-linear Theory of High Order Correlations. William C. Saslaw and Andrew J. S. Hamilton. **276**, 13, 1-B4 (1984)
- HAMILTON, T. T. Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles. **286**, 196, 124-B2 (1984)
- HAMMER, REINER. Energy Balance of Stellar Coronae. III. Effect of Stellar Mass and Radius. Reiner Hammer. **280**, 780, 58-D3 (1984)
- HAMMERSCHLAG-HENSBERGE, G. Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. G. Hammerschlag-Hensberge, T. R. Kallman, and I. D. Howarth. **283**, 249, 88-F8 (1984)
- Cygnus X-2: Neutron Star or Degenerate Dwarf? J. E. McClintock, L. D. Petro, G. Hammerschlag-Hensberge, C. R. Proffitt, and R. A. Remillard. **283**, 794, 95-E9 (1984)
- HANAWA, TOMOYUKI. Thermal Evolution of Accreting Neutron Stars. Masayuki Y. Fujimoto, Tomoyuki Hanawa, Icko Iben, Jr., and M. B. Richardson. **278**, 813, 34-F13 (1984)
- HANEL, R. The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager Iris Spectra: NH₃, PH₃, C₂H₂, C₂H₆, CH₃D, CH₄, and the Saturnian D/H Isotopic Ratio. R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel. **287**, 899, 144-A14 (1984)
- HANEL, R. A. The Helium Abundance of Saturn from Voyager Measurements. B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein. **282**, 807, 83-G8 (1984)
- HANNER, MARTHA S. Comet Cernis: Icy Grains at Last? Martha S. Hanner. **277**, L75, 23-A1 (1984)
- HANSEN, C. J. Electromagnetic Damping of Neutron Star Oscillations. P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen. **281**, 746, 70-F2 (1984)
- HANSEN, CARL J. Rotational Mode Splitting about an Inclined Axis. Morris L. Aizenman, Carl J. Hansen, John P. Cox, and W. Dean Pesnell. **286**, L43, 132-D13 (1984)
- HANSEN, J. E. Calculations of Transition Probabilities for Forbidden Lines in the 3d⁷ Ground Configurations of Co III and Ni IV. J. E. Hansen, A. J. J. Raassen, and P. H. M. Uylings. **277**, 435, 15-E13 (1984)
- HARDEE, PHILIP E. Propagation and Growth of Surface Waves on a Supersonic Fluid Jet. Philip E. Hardee. **277**, 106, 12-B3 (1984)
- Helical Twisting on an Adiabatically Expanding Jet. I. Propagation and Temporal Growth. Philip E. Hardee. **287**, 523, 139-G10 (1984)
- HARDING, A. K. Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway. **278**, 369, 28-A6 (1984)
- HARDING, ALICE K. Pair Production Rates in Mildly Relativistic, Magnetized Plasmas. Michael L. Burns and Alice K. Harding. **285**, 747, 119-F1 (1984)
- HARDING, PAUL. Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York. **281**, 585, 69-A5 (1984)
- HARDY, EDUARDO. The Population Structure of the Large Magellanic Cloud Bar. Eduardo Hardy, Roberto Buonanno, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer. **278**, 592, 32-D3 (1984)
- The Population Structure of the Wing of the Small Magellanic Cloud. Eduardo Hardy and Daniel Durand. **279**, 567, 44-A13 (1984)
- The Clusters NGC 419 and NGC 416 in the Wing of the Small Magellanic Cloud. Daniel Durand, Eduardo Hardy, and Jorge Melnick. **283**, 552, 92-G7 (1984)
- HARLAN, EUGENE. Rapid Rotation and H α Emission Anomalies among Some Members of the Population of Low-Mass Stars. Arthur Young,

- Andrew Skumanich, and Eugene Harlan. **282**, 683, 82-D13 (1984)
- HARDEN, F. R. Einstein Observations of X-Ray Emission from A Stars: Erratum. L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr. **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- HARDEN, F. R., JR. The X-Ray Nebula around PSR 1509 - 58. F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank. **281**, 650, 69-E14 (1984)
- Einstein Observations of the Crab Nebula Pulsar. F. R. Harnden, Jr. and F. D. Seward. **283**, 279, 89-A12 (1984)
- Discovery of a 50 Millisecond Pulsar in the Large Magellanic Cloud. F. D. Seward, F. R. Harnden, Jr., and David J. Helfand. **287**, L19, 138-D5 (1984)
- HARPER, D. A. NGC 2024: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein. **280**, 154, 50-F5 (1984)
- Far-Infrared Selected Star Formation Regions. D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran. **281**, 225, 63-D1 (1984)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper. **282**, 427, 79-G4 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper. **284**, 597, 105-E12 (1984)
- On the Nature of the Material Surrounding Vega. D. A. Harper, R. F. Loewenstein, and J. A. Davidson. **285**, 808, 120-C8 (1984)
- HARRINGTON, J. PATRICK. The Remarkable Ultraviolet Spectrum of the Planetary Nebula Abell 30. J. Patrick Harrington and Walter A. Feibelman. **277**, 716, 20-A1 (1984)
- The Dust Content of the Planetary Nebula IC 3568. Martin Cohen, J. Patrick Harrington, and Rhys Hess. **283**, 687, 94-D9 (1984)
- HARRINGTON, R. S. Photographic Measures of Double Stars. F. J. Josties and R. S. Harrington. **54**, 103, 2-D5 (1984) (Abstr. in **275**, 928, 147-F1)
- HARRINGTON, ROBERT S. The Orientation of the Orbit Plane of Algol AB. Robert S. Harrington. **277**, L69, 22-G6 (1984)
- HARRIS, A. W. The Correlation of Interstellar Element Depletions with Mean Gas Density. A. W. Harris, C. Gry, and G. E. Bromage. **284**, 157, 99-G1 (1984)
- HARRIS, D. E. The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. D. E. Harris, C. H. Costain, and P. E. Dewdney. **280**, 532, 55-F3 (1984)
- X-Ray Emission from Stephan's Quintet and Other Compact Groups. Neta A. Bahcall, D. E. Harris, and Herbert J. Rood. **284**, L29, 109-A12 (1984)
- HARRIS, GRETCHEN L. H. The NGC 5128 Globular Cluster System. James E. Hesser, Hugh C. Harris, Sidney van den Bergh, and Gretchen L. H. Harris. **276**, 491, 7-A1 (1984)
- The NGC 5128 Globular Cluster System: Star Counts in U, V, and R. Gretchen L. H. Harris, James E. Hesser, Hugh C. Harris, and Patrick J. Curry. **287**, 175, 134-G7 (1984)
- The NGC 5128 Globular Cluster System: A Complete Analysis of Images Using COSMOS. Hugh C. Harris, Gretchen L. H. Harris, James E. Hesser, and Harvey T. MacGillivray. **287**, 185, 135-A3 (1984)
- HARRIS, HUGH C. The NGC 5128 Globular Cluster System. James E. Hesser, Hugh C. Harris, Sidney van den Bergh, and Gretchen L. H. Harris. **276**, 491, 7-A1 (1984)
- Abundances of Distant Classical Cepheid Variables. Hugh C. Harris and Catherine A. Pilachowski. **282**, 655, 82-B13 (1984)
- The NGC 5128 Globular Cluster System: Star Counts in U, V, and R. Gretchen L. H. Harris, James E. Hesser, Hugh C. Harris, and Patrick J. Curry. **287**, 175, 134-G7 (1984)
- The NGC 5128 Globular Cluster System: A Complete Analysis of Images Using COSMOS. Hugh C. Harris, Gretchen L. H. Harris, James E. Hesser, and Harvey T. MacGillivray. **287**, 185, 135-A3 (1984)
- HARRIS, MICHAEL J. Oxygen Isotopes in the Atmospheres of Betelgeuse and Antares. Michael J. Harris and David L. Lambert. **281**, 739, 70-E9 (1984)
- Oxygen Isotopic Abundances in the Atmospheres of Seven Red Giant Stars. Michael J. Harris and David L. Lambert. **285**, 674, 118-G7 (1984)
- HARRIS, S. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- IRAS Observations of OH/IR Stars. F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch. **278**, L41, 29-E13 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46-47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Infrared Emission from M31. H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer. **278**, L59, 30-A1 (1984)
- A 25 Micron Component in 3C 390.3. G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young. **278**, L79, 30-C14 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- HARRIS, WILLIAM E. Color-Magnitude Photometry for the Globular Cluster NGC 288. Edward W. Obzowski, R. Canterna, and William E. Harris. **281**, 158, 62-E13 (1984)
- HARRISON, A. B. Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley. **286**, L35, 132-D6 (1984)
- HARTEN, R. H. Extended Radio Observations of the SNR CTB 109. V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner. **283**, 147, 87-F1 (1984)
- HARTIGAN, P. Discovery of the First Carbon Star in NGC 6822. M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman. **277**, L9, 16-A9 (1984)
- HARTKOPF, WILLIAM I. Speckle Interferometric Measurements of Binary Stars. IX. Harold A. McAlister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel. **54**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)
- HARTMANN, L. An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan. **276**, 254, 3-E12 (1984)
- A High-Resolution Study of 'Herbig-Haro Objects 1 and 2. L. Hartmann and J. C. Raymond. **276**, 560, 7-F4 (1984)
- A Study of the Dependence of Mg II Emission on the Rotational Periods of Main-Sequence Stars. L. Hartmann, S. L. Baliunas, D. K. Duncan, and R. W. Noyes. **279**, 778, 46-C10 (1984)
- Chromospheres and Mass Loss in Metal-deficient Giant Stars. A. K. Dupree, L. Hartmann, and E. H. Avrett. **281**, L37, 66-G7 (1984)
- On the Extended Chromosphere of α Orionis. L. Hartmann and E. H. Avrett. **284**, 238, 100-F1 (1984)
- HARTMANN, L. W. Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan. **279**, 763, 46-B8 (1984)
- HARTMANN, LEE. Rotational Velocities of Low-Mass Stars in the Pleiades. John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham. **280**, 202, 51-C4 (1984)
- HARTMANN, LEE W. How to Find Galaxies at High Redshift. Lee W. Hartmann, John P. Huchra, and Margaret J. Geller. **287**, 487, 139-D13 (1984)
- HARTQUIST, T. W. On the Photoproduction of Triply Ionized Carbon and Silicon in the Galactic Halo. T. W. Hartquist, M. Pettini, and A. Tallant. **276**, 519, 7-C4 (1984)
- Why Do Few High-Redshift QSO Narrow-Line Absorption Systems Exhibit Mixed Ionization Spectra? T. W. Hartquist and J. E. Dyson. **279**, L35, 48-A5 (1984)
- The Heating of Cloud-Hot Phase Interface Regions by the Dissipation of Hydromagnetic Waves. T. W. Hartquist and G. E. Morfill. **287**, 194, 135-A13 (1984)
- HARTWICK, F. D. A. Studies of Late-Type Dwarfs. VI. Identification of Population II Main-Sequence Stars at $M_v = +14$. F. D. A. Hartwick, A. P. Cowley, and J. R. Mould. **286**, 269, 124-G6 (1984)
- HARVEY, P. M. The Formation of Massive Stars along the W5 Ionization Front. B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R.

- Doering. 279, 291, 40-B12 (1984)
- HARVEY, PAUL M. Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. *Paul M. Harvey, Bruce A. Wilking, and Marshall Joy*. 278, 156, 25-F8 (1984)
- Far-Infrared Studies of Herbig-Haro Objects and Their Exciting Stars. *Martin Cohen, Paul M. Harvey, Richard D. Schwartz, and Bruce A. Wilking*. 278, 671, 33-C6 (1984)
- NGC 6334-V—An Infrared Bipolar Nebula. *Paul M. Harvey and Bruce A. Wilking*. 280, L19, 54-D9 (1984)
- Far-Infrared Observations of Southern Herbig-Haro Objects. *Martin Cohen, Richard D. Schwartz, Paul M. Harvey, and Bruce A. Wilking*. 281, 250, 63-E12 (1984)
- Infrared and Millimeter-Wave Observations of the Sharpless 156 Molecular Cloud. *Marshall Joy, Neal J. Evans II, Paul M. Harvey, and Bruce A. Wilking*. 284, 161, 99-G5 (1984)
- Far-Infrared Photometry of Compact Extragalactic Sources: OJ 287 and BL Lacertae. *Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking*. 287, L9, 138-C10 (1984)
- HASAN, S. SIRAJUL. Time-resolved Spectral Observations of Spicule Velocities at Several Heights. *S. Sirajul Hasan and Stephen L. Keil*. 283, L75, 97-D11 (1984)
- Convective Instability in a Solar Flux Tube. I. Nonlinear Calculations for an Adiabatic Inviscid Fluid. *S. Sirajul Hasan*. 285, 851, 120-F9 (1984)
- HASCHICK, AUBREY D. The Peculiar Galaxy IC 4553: VLA-A Observations of the OH Megamaser. *Willem A. Baan and Aubrey D. Haschick*. 279, 541, 43-F12 (1984)
- HASEGAWA, T. High Spatial Resolution Observations of Orion Bright Bar: CS ($J = 1-0$) and H51 α Emission. *T. Omodaka, M. Hayashi, and T. Hasegawa*. 282, L77, 85-C9 (1984)
- The H51 α Emission Associated with the Shocked Gas in Orion-KL. *T. Hasegawa and K. Akabane*. 287, L91, 145-E14 (1984)
- HASEGAWA, TETSUO. CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane*. 283, 117, 87-C10 (1984)
- HATHAWAY, DAVID H. A Convective Model for Turbulent Mixing in Rotating Convection Zones. *David H. Hathaway*. 276, 316, 4-C4 (1984)
- HAUSER, M. G. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. 278, L1, 29-C3 (1984)
- The IRAS Minisurvey. *M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker*. 278, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. *M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker*. 278, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius*. 278, L19, 29-D8 (1984)
- IRAS Images of the Galactic Center. *T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden*. 278, L57, 29-G4 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. *J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker*. 278, L63, 30-A7 (1984)
- Infrared Galaxies in the IRAS Minisurvey. *B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young*. 278, L71, 30-C5 (1984)
- Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. *M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall*. 283, 566, 93-A10 (1984)
- Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^{\circ}$ to $l = +62^{\circ}$: Structure and Energetics of the Inner Disk. *M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung*. 285, 74, 110-F14 (1984)
- HAUSMAN, MARK. Spiral Structure and Star Formation. I. Formation Mechanisms and Mean Free Paths. *William W. Roberts, Jr. and Mark Hausman*. 277, 744, 20-C2 (1984)
- HAUSMAN, MARK A. Spiral Structure and Star Formation. II. Stellar Lifetimes and Cloud Kinematics. *Mark A. Hausman and William W. Roberts, Jr.*. 282, 106, 75-B4 (1984)
- HAWLEY, JOHN F. A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. *John F. Hawley, Larry L. Smarr, and James R. Wilson*. 277, 296, 14-B9 (1984)
- A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration. *John F. Hawley, Larry L. Smarr, and James R. Wilson*. 55, 211, 13-G13 (1984) (Abstr. in 280, 938, 60-B2)
- HAYAKAWA, S. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. *Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. 276, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. 280, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsumo, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. 283, 774, 95-D3 (1984)
- HAYASHI, CHUSHIRO. Criteria for Collapse and Fragmentation of Rotating, Isothermal Clouds. *Shoken M. Miyama, Chushiro Hayashi, and Shinji Narita*. 279, 621, 44-E11 (1984)
- HAYASHI, M. High Spatial Resolution Observations of Orion Bright Bar: CS ($J = 1-0$) and H51 α Emission. *T. Omodaka, M. Hayashi, and T. Hasegawa*. 282, L77, 85-C9 (1984)
- HAYES, DANIEL P. The Morphology of a Mass Loss Episode of the Be Star ω Orionis. *Daniel P. Hayes and Edward F. Guinan*. 279, 721, 45-F8 (1984)
- The Abrupt Onset of a Major ω Orionis Mass Loss Episode. *Edward F. Guinan and Daniel P. Hayes*. 287, L39, 138-E11 (1984)
- Variations of Betelgeuse's Optical Linear Polarization over Four Consecutive Observing Seasons: 1979-1983. *Daniel P. Hayes*. 55, 179, 13-E6 (1984) (Abstr. in 280, 940, 60-B4)
- HAYLES, R. I. On the Morphology and Spectra of the Short Gamma-Ray Bursts. *C. Barat, R. I. Hayles, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zenchenko*. 285, 791, 120-B3 (1984)
- HAYMES, R. C. Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. *J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boctel, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes*. 279, 177, 39-A1 (1984)
- HAZARD, C. Nine New Quasi-stellar Objects with Broad Absorption Lines. *C. Hazard, Donald C. Morton, Roberto Terlevich, and Richard McMahon*. 282, 33, 74-C10 (1984)
- HE, X. T. Complete Quasar Search in the NGC 1097 Field. *Halton Arp, R. D. Wolstencroft, and X. T. He*. 285, 44, 110-D7 (1984)
- HEBENÝ, I. The Far-Ultraviolet Energy Distribution of Sirius B from Voyager 2. *J. B. Holberg, F. Wesemael, and I. Hebený*. 280, 679, 57-C5 (1984)
- HEBER, U. Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. *J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray*. 278, 224, 26-D8 (1984)
- HECHT, J. H. The Dust around R Coronae Borealis Type Stars. *J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu*. 280, 228, 51-E3 (1984)
- HECKATHORN, JOY N. The High-Ionization and Excited-State Interstellar Lines in the Carina Nebula: A Giant H II Region in Absorption. *Nolan R. Walborn, Joy N. Heckathorn, and James E. Hesser*. 276, 524, 7-C9 (1984)
- HECKMAN, T. M. IUE Observations of High-Redshift Quasars. *Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman*. 281, 76, 61-F12 (1984)
- The Kinematics of the Narrow-Line Region in Active Galaxies and Quasars. III. Correlations with the Broad-Line Region and Radio Emission. *T. M. Heckman, G. K. Miley, and R. F. Green*. 281, 525, 68-C9 (1984)
- Emission-Line Gas Associated with the Radio Lobes of the High-Luminosity Radio Source 3C 171. *T. M. Heckman, W. J. M. van*

- Bruegel, and G. K. Miley. **286**, 509, 128-F5 (1984)
- HECKMAN, TIMOTHY. Optical Line Emission Associated with the Radio Galaxy 4C 26.42 in the Cluster of Galaxies Abell 1795. *Wil van Bruegel, Timothy Heckman, and George Miley*. **276**, 79, 1-F14 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Bruegel, Timothy Heckman, Harvey Butcher, and George Miley*. **277**, 82, 11-G5 (1984)
- HEDLER, R. L. Millisecond Variability of Cygnus X-1. *J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman*. **278**, 288, 27-B6 (1984)
- HEESCHEN, D. S. Compact-Core-dominated Radio Emission from Bright E/S0 Galaxies. *J. M. Wrobel and D. S. Heeschen*. **287**, 41, 133-D5 (1984)
- HEGE, KEITH. The Time Dependence of Chromospheric Decay for Solar Type Stars. *Don C. Barry, Keith Hege, and Richard H. Cromwell*. **277**, L65, 22-G2 (1984)
- HEILES, CARL. Reddening Estimates for Galaxies in the Second Reference Catalog and the Uppsala General Catalog. *David Burstein and Carl Heiles*. **54**, 33, 1-C4 (1984) (Abstr. in **275**, 927, 147-E14)
- H I Shells, Supershells, Shell-like Objects, and "Worms". *Carl Heiles*. **55**, 585, 19-D1 (1984) (Abstr. in **282**, 821, 84-A11)
- HEILIGMAN, G. M. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. *C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. *M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **285**, L79, 121-G2 (1984)
- HEINTZ, W. D. The Triple Star Zeta Aquarii. *W. D. Heintz*. **284**, 806, 107-F3 (1984)
- HEISLER, J. Are Cosmologically Distant Objects Obscured by Dust? A Test Using Quasars. *J. P. Ostriker and J. Heisler*. **278**, 1, 24-A6 (1984)
- HELFAND, D. J. New Radio Observations of the Composite Supernova Remnant G29.7 - 0.3. *R. H. Becker and D. J. Helfand*. **283**, 154, 87-F9 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. *A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles*. **286**, 196, 124-B2 (1984)
- X-Rays from Accretion of Red Giant Winds. *M. Jura and D. J. Helfand*. **287**, 785, 142-G8 (1984)
- HELFAND, DAVID J. An X-Ray Study of the Remnant of SN 185 A.D. *Ryszard L. Pisarski, David J. Helfand, and Steven M. Kahn*. **277**, 710, 19-G7 (1984)
- Interpretation of the Number versus Diameter Distribution for Supernova Remnants in the Large Magellanic Cloud. *John P. Hughes, David J. Helfand, and Steven M. Kahn*. **281**, L25, 65-F11 (1984)
- Discovery of a 50 Millisecond Pulsar in the Large Magellanic Cloud. *F. D. Seward, F. R. Harnden, Jr., and David J. Helfand*. **287**, L19, 138-D5 (1984)
- An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 - 693 in the Large Magellanic Cloud. *Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds*. **287**, L23, 138-D9 (1984)
- HELPER, H. L. Magnetic Field Structure in the Taurus Dark Cloud. *Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry*. **282**, 508, 80-F4 (1984)
- On the Bizarre Gamma-Ray Spectrum of SS 433. *H. L. Helfer and M. P. Savedoff*. **283**, L49, 97-B12 (1984)
- Abundances in Galactic H II Regions. III. G25.4 - 0.2, G45.5 + 0.06, M8, S159, and DR 22. *J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones*. **285**, 174, 111-G5 (1984)
- HELLABY, CHARLES. The Redshift Structure of the Big Bang in Inhomogeneous Cosmological Models. I. Spherical Dust Solutions. *Charles Hellaby and Kayll Lake*. **282**, 1, 74-A6 (1984)
- HELLINGS, RONALD W. Primordial Gravitational Waves and the Blackbody Radiation Anisotropy. *Peter J. Adams, Ronald W. Hellings, and Robert L. Zimmerman*. **280**, L39, 60-D4 (1984)
- HELMINGER, PAUL. Laboratory Millimeter and Submillimeter Spectra of HNO and DNO. *K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia*. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- HELOU, GEORGE. The Remarkable Infrared Galaxy Arp 220 = IC 4553. *B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson*. **283**, L1, 91-E3 (1984)
- Spin Statistics in Binary Galaxies: Implications for Formation and Evolution. *George Helou*. **284**, 471, 104-C9 (1984)
- H I Observations in the Virgo Cluster Area. II. A Complete, Magnitude-Limited Sample of Spiral Galaxies. *George Helou, G. Lyle Hoffman, and E. E. Salpeter*. **55**, 433, 17-A1 (1984) (Abstr. in **281**, 890, 72-C3)
- HEMEON-HEYER, MARK. Bipolar Outflows in Dark Clouds. *Paul F. Goldsmith, Ronald L. Snell, Mark Hemeon-Heyer, and William D. Langer*. **286**, 599, 129-F7 (1984)
- HENDRY, ELAINE M. Speckle Interferometric Measurements of Binary Stars. IX. Harold A. McAlister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel. **54**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)
- HENKEL, C. Ammonia Absorption toward NGC 7538 IRS 1: 2 Arc Second Observations in the (3,3) Line. *C. Henkel, T. L. Wilson, and K. J. Johnston*. **282**, L93, 85-D10 (1984)
- ²¹-²¹ Formaldehyde Emission from DR 21(OH). *K. J. Johnston, C. Henkel, and T. L. Wilson*. **285**, L85, 121-G7 (1984)
- HENRIKSEN, MARK J. An X-Ray Survey of Variable Radio Bright Quasars. *Mark J. Henriksen, Francis E. Marshall, and Richard F. Mushotzky*. **284**, 491, 104-E1 (1984)
- HENRIKSEN, R. N. Jet Deflection by Ram Pressure and Pressure Gradients. *Ralph Fiedler and R. N. Henriksen*. **281**, 554, 68-E10 (1984)
- Star Cloud Turbulence. *R. N. Henriksen and B. E. Turner*. **287**, 200, 135-B5 (1984)
- HENRIKSEN, RICHARD N. The Electron Energy Spectrum Produced in Radio Sources by Turbulent, Resonant Acceleration. *Jean A. Eilek and Richard N. Henriksen*. **277**, 820, 21-B1 (1984)
- HENRY, GREGORY W. Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. *Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry*. **282**, 226, 76-D2 (1984)
- HENRY, J. P. The Location of Infrared Sources in the Galactic Center from a Deep 1 Micron CCD Image. *J. P. Henry, D. L. DePoy, and E. E. Becklin*. **285**, L27, 114-G12 (1984)
- HENRY, J. PATRICK. Optical Observations of the BL Lacertae Object 2155 - 304 and Implications regarding the X-Ray Absorption Feature at 600-700 eV. *Stuart Bowyer, Jean Brodie, John T. Clarke, and J. Patrick Henry*. **278**, L103, 36-B7 (1984)
- The X-Ray Luminosity Function of Abell Clusters at a Redshift of 0.25. *J. Patrick Henry and Russell J. Lavery*. **280**, 1, 49-A6 (1984)
- Infrared Observations of the 3C 273 Jets. *J. Patrick Henry, E. E. Becklin, and C. M. Telesco*. **280**, 98, 50-B1 (1984)
- HENRY, R. B. C. Metal Abundances in the Hot DA White Dwarf Wolf 1346 and Feige 24. *F. Wesemael, R. B. C. Henry, and H. L. Shipman*. **287**, 868, 143-F11 (1984)
- HENRY, R. C. Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. *W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky*. **285**, 801, 120-C1 (1984)
- HENRY, RICHARD B. C. Near-Infrared Spectrophotometry of Crab Nebula Filaments. *Richard B. C. Henry, Gordon M. MacAlpine, and Robert P. Kirshner*. **278**, 619, 32-F8 (1984)
- The Unusual Nickel/Iron Abundance Ratio in the Crab Nebula Filaments. *Richard B. C. Henry*. **281**, 644, 69-E8 (1984)
- HENRY, RONALD J. W. Oscillator Strengths and Collision Strengths for S III. *Y. K. Ho and Ronald J. W. Henry*. **282**, 816, 84-A6 (1984)
- On the Magnetic Field in the White Dwarf Grw + 70°8247. *Ronald J. W. Henry and R. F. O'Connell*. **282**, L97, 85-D14 (1984)
- Collision Strengths for Al199 and Al1729 of S III. *Y. K. Ho and Ronald J. W. Henry*. **284**, 435, 102-F2 (1984)
- HERBST, ERIC. Calculations Concerning the HCO⁺/HOC⁺ Abundance Ratio in Dense Interstellar Clouds. *D. J. DeFrees, A. D. McLean, and Eric Herbst*. **279**, 322, 40-E3 (1984)
- Laboratory Submillimeter Transition Frequencies of ⁷LiH and ⁶LiH. *Grant M. Plummer, Eric Herbst, and Frank C. De Lucia*. **282**, L113, 85-F1 (1984)
- Theoretical Reinvestigation of Hydrocarbon and Cyanoacetylene Abundances in TMC-1. *Eric Herbst, Nigel G. Adams, and David Smith*. **285**, 618, 118-C7 (1984)
- ¹³CH₃OH in OMC-1. *Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia*. **286**, 586, 129-E8 (1984)
- Laboratory Millimeter and Submillimeter Spectra of HNO and DNO. *K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia*. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- The Millimeter and Submillimeter Laboratory Spectrum of Methyl Formate in its Ground Symmetric Torsional State. *Grant M. Plummer, Eric Herbst, Frank C. De Lucia, and Geoffrey A. Blake*. **55**, 633, 20-C10 (1984) (Abstr. in **282**, 821, 84-A11)

- Synthesis of Complex Molecules in Dense Interstellar Clouds via Gas-Phase Chemistry: A Pseudo Time-dependent Calculation. *Chun Ming Leung, Eric Herbst, and Walter F. Huebner*. **56**, 231, 25-D7 (1984) (Abstr. in **284**, 870, 108-E2)
- HERMSEN, W. The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. *J. B. G. M. Bloemen, L. Blitz, and W. Hermesen*. **279**, 136, 38-D9 (1984)
- HERNUST, LARS. Analytical Models of Neutron Star Envelopes. *Lars Hernquist and James H. Applegate*. **287**, 244, 135-E8 (1984)
- Relativistic Electron Transport in a Quantizing Magnetic Field. *Lars Hernquist*. **56**, 325, 27-C7 (1984) (Abstr. in **285**, 875, 121-A6)
- HEROLD, H. Comment on "Scaling Laws for Hydrogen-like Atoms in Magnetic Fields of Arbitrary Strength". *H. Herold, H. Ruder, and G. Wunner*. **285**, 870, 121-A1 (1984)
- HERTER, T. Detection of the [Ne III] 36 Micron Line in the Planetary Nebula NGC 6543. *M. A. Shure, J. R. Houck, G. E. Gull, and T. Herter*. **281**, L29, 65-G1 (1984)
- Abundances in Galactic H II Regions. III. G25.4 - 0.2, G45.5 + 0.06, M8, S159, and DR 22. *J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones*. **285**, 174, 111-G5 (1984)
- The Electron Density in M82 from the S III Mid-Infrared Line Ratio. *J. R. Houck, M. A. Shure, G. E. Gull, and T. Herter*. **287**, L11, 138-C12 (1984)
- The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. *T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf*. **287**, L15, 138-D1 (1984)
- HERTZ, P. Determination of the Mass of Globular Cluster X-Ray Sources. *J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman*. **282**, L13, 78-A13 (1984)
- HERTZ, PAUL. The Einstein Galactic Plane Survey: Statistical Analysis of the Complete X-Ray Sample. *Paul Hertz and Jonathan E. Grindlay*. **278**, 137, 25-E3 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. *Paul Hertz and Jonathan E. Grindlay*. **282**, 118, 75-C2 (1984)
- HERZOG, A. D. Solar Luminosity Fluctuations and Active Region Photometry. *G. A. Chapman, A. D. Herzog, J. K. Lawrence, and J. C. Shelton*. **282**, L99, 85-E2 (1984)
- HESS, RHYSS. The Dust Content of the Planetary Nebula IC 3568. *Martin Cohen, J. Patrick Harrington, and Rhys Hess*. **283**, 687, 94-D9 (1984)
- HESSER, JAMES E. The NGC 5128 Globular Cluster System. *James E. Hesser, Hugh C. Harris, Sidney van den Bergh, and Gretchen L. H. Harris*. **276**, 491, 7-A1 (1984)
- The High-Ionization and Excited-State Interstellar Lines in the Carina Nebula: A Giant H II Region in Absorption. *Nolan R. Walborn, Joy N. Heckathorn, and James E. Hesser*. **276**, 524, 7-C9 (1984)
- Spectroscopy over a Range of 5 Magnitudes in NGC 6752. *R. A. Bell, James E. Hesser, and R. D. Cannon*. **283**, 615, 93-F3 (1984)
- The NGC 5128 Globular Cluster System: Star Counts in U, V, and R. *Gretchen L. H. Harris, James E. Hesser, Hugh C. Harris, and Patrick J. Curry*. **287**, 175, 134-G7 (1984)
- The NGC 5128 Globular Cluster System: A Complete Analysis of Images Using COSMOS. *Hugh C. Harris, Gretchen L. H. Harris, James E. Hesser, and Harvey T. MacGillivray*. **287**, 185, 135-A3 (1984)
- HESSMAN, F. V. Time-resolved Spectroscopy of SS Cygni at Minimum and Maximum Light. *F. V. Hessman, E. L. Robinson, R. E. Nather, and E.-H. Zhang*. **286**, 747, 131-C8 (1984)
- HEWITT, J. N. 5 Gigahertz Structure and Optical Identifications of Weak Extragalactic Radio Sources. *C. R. Lawrence, C. L. Bennett, J. N. Hewitt, and B. F. Burke*. **278**, L95, 36-A12 (1984)
- HIBBERT, A. Interstellar Magnesium Abundances. *M. J. Murray, P. L. Dufton, A. Hibbert, and D. G. York*. **282**, 481, 80-D5 (1984)
- HIEI, EIJIRO. A Skylab Flare Associated with a Hard X-Ray Burst. *Kenneth Widing and Eihiro Hiei*. **281**, 426, 65-E4 (1984)
- HIGDON, J. C. Density Fluctuations in the Interstellar Medium: Evidence for Anisotropic Magnetogasdynamic Turbulence. I. Model and Astrophysical Sites. *J. C. Higdon*. **285**, 109, 111-B9 (1984)
- HILDEBRAND, R. H. The Massive Core of W51. *D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand*. **279**, L51, 48-B8 (1984)
- Far-Infrared Selected Star Formation Regions. *D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran*. **281**, 225, 63-D1 (1984)
- Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. *D. T. Jaffe, J. A. Davidson, M. Dragovan, and R. H. Hildebrand*. **284**, 637, 106-A10 (1984)
- Detection of Submillimeter Polarization in the Orion Nebula. *R. H. Hildebrand, M. Dragovan, and G. Novak*. **284**, L51, 109-C7 (1984)
- Submillimeter Continuum Observations of M82. *D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand*. **285**, L31, 115-A2 (1984)
- HILL, G. A Radial Velocity Study of XY Leonis. *B. J. Hrivnak, E. F. Milone, G. Hill, and W. A. Fisher*. **285**, 683, 119-A4 (1984)
- HILL, G. J. E2003 + 225: A 3^h42^m AM Herculis Type Binary System. *J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal*. **277**, 682, 19-E7 (1984)
- HILL, H. A. Effects of the Nonlocal Character of the Mean Intensity, Deviations from Radiative Equilibrium, and a Nongray Atmosphere on Oscillations in Stellar Envelopes. *H. A. Hill and J. D. Logan*. **285**, 386, 114-B5 (1984)
- HILL, JESSE K. Images in the Rocket Ultraviolet: Photometry of M101. *Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher*. **277**, 542, 18-A5 (1984)
- HILLIER, D. J. The Influence of Electron Scattering on the He II Line Profiles of HD 50896. *D. J. Hillier*. **280**, 744, 58-A1 (1984)
- HILTNER, W. A. CPD - 48°1577: The Brightest Known Cataclysmic Variable. *R. F. Garrison, R. E. Schild, W. A. Hiltner, and W. Krzeminski*. **276**, L13, 5-E13 (1984)
- HINKLE, KENNETH H. Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. *David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson*. **284**, 223, 100-D14 (1984)
- Time Series Infrared Spectroscopy of Mira Variables. II. CO $\delta_2 = 3$ in Eight Mira Variables and One SRa Variable. *Kenneth H. Hinkle, Werner W. G. Scharlach, and Donald N. B. Hall*. **56**, 1, 22-A2 (1984) (Abstr. in **283**, 905, 96-F12)
- HINTZEN, PAUL. Wide-Angle Radio Tail QSOs as Members of Clusters of Galaxies. II. Direct Optical Observations and Spectroscopy of QSO Fields. *Paul Hintzen*. **55**, 533, 18-A1 (1984) (Abstr. in **281**, 891, 72-C4)
- HIRABAYASHI, HISASHI. CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane*. **283**, 117, 87-C10 (1984)
- HIROTA, EIJI. Laboratory Millimeter-Wave Spectrum of Iron Monoxide, FeO. *Yasuki Endo, Shuji Saito, and Eizi Hirota*. **278**, L131, 36-D13 (1984)
- HJALMARSON, Å. The Detection of Interstellar Methylcyanoacetylene. *N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarson*. **276**, L25, 5-F14 (1984)
- High-Velocity HCO⁺ in Cepheus A: Ionization Levels in High-Density Clumps within a Molecular Flow. *Robert B. Loren, Ahwyn Wooten, Å. Sandqvist, P. Friberg, and A. Hjalmarson*. **287**, 707, 142-A11 (1984)
- HJALMARSON, ÅKE. The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO⁺ Flow in NGC 2071. *Ahwyn Wooten, Robert B. Loren, Å. Sandqvist, Per Friberg, and Åke Hjalmarson*. **279**, 633, 44-F14 (1984)
- HO, PAUL T. P. An Aperture Synthesis Map of HCN Emission Close to W3 IRS 4. *Melvin C. H. Wright, Hélène R. Dickel, and Paul T. P. Ho*. **281**, L71, 73-B6 (1984)
- HO, Y. K. Oscillator Strengths and Collision Strengths for S III. *Y. K. Ho and Ronald J. W. Henry*. **282**, 816, 84-A6 (1984)
- Collision Strengths for $\lambda 1199$ and $\lambda 1729$ of S III. *Y. K. Ho and Ronald J. W. Henry*. **284**, 435, 102-F2 (1984)
- HOBBS, L. M. On Absorption by Hot Interstellar Gas. I. [Fe x] $\lambda 6375$. *L. M. Hobbs*. **280**, 132, 50-D10 (1984)
- On Absorption by Hot Interstellar Gas. II. [Fe xiv] $\lambda 5303$. *L. M. Hobbs and C. E. Albert*. **281**, 639, 69-E3 (1984)
- On Interstellar [Fe x] Absorption toward Cepheus OB2. *L. M. Hobbs*. **284**, L47, 109-C3 (1984)
- The Abundance of Interstellar Lithium. *L. M. Hobbs*. **286**, 252, 124-F3 (1984)
- Optical Interstellar Absorption Lines toward 29 Stars. *L. M. Hobbs*. **56**, 315, 27-B11 (1984) (Abstr. in **285**, 874, 121-A5)
- HOBBS, R. H. Low-Temperature Dissociative Recombination of $e + H_2^+$. *H. H. Michels and R. H. Hobbs*. **286**, L27, 126-F1 (1984)
- HOCKADAY, M. P. Analysis of Magnesium xi Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthaus, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark*. **282**, 784, 83-E13 (1984)
- HODGE, P. E. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock*. **278**, 521, 31-E14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R.*

- Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- HODGE, P. W. LMC Blue Globular Clusters Containing Cepheids. I. NGC 1856. P. W. Hodge and S.-O. Lee. **276**, 509, 7-B7 (1984)
- HODGE, PAUL. The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. Erika Böhm-Vitense, Paul Hodge, and Don Boggs. **287**, 825, 143-C7 (1984)
- HOESSEL, J. G. Photometry of Resolved Galaxies. IV. Holmberg I and Holmberg II. J. G. Hoessel and G. E. Danielson. **286**, 159, 123-E9 (1984)
- HOFFMAN, G. LYLE. H I Observations in the Virgo Cluster Area. II. A Complete, Magnitude-Limited Sample of Spiral Galaxies. George Helou, G. Lyle Hoffman, and E. E. Salpeter. **55**, 433, 17-A1 (1984) (Abstr. in **281**, 890, 72-C3)
- HOFFMAN, J. A. The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- HOFFMANN, W. F. Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Sitter, H. A. Thronson, Jr., and T. Kelsall. **283**, 566, 93-A10 (1984)
- HOFFMANN, WILLIAM F. High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio. **279**, 685, 45-C12 (1984)
- HOGAN, CRAIG J. Microwave Background Anisotropy and Hydrodynamic Formation of Large-Scale Structure. Craig J. Hogan. **284**, L1, 103-A2 (1984)
- HÖGLUND, B. The Detection of Interstellar Methylcyanoacetylene. N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarsen. **276**, L25, 5-F14 (1984)
- HOLBERG, J. B. The Far-Ultraviolet Energy Distribution of Sirius B from Voyager 2. J. B. Holberg, F. Wesemael, and I. Hebeiy. **280**, 679, 57-C5 (1984)
- Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenlid. **281**, 766, 70-G8 (1984)
- Far-Ultraviolet Spectrophotometry of Two Very Hot O Type Subdwarfs. J. S. Drilling, J. B. Holberg, and D. Schönberner. **283**, L67, 97-D3 (1984)
- HOLLENBACH, D. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey. **276**, 551, 7-E9 (1984)
- HOLLENBACH, D. J. Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson. **282**, L81, 85-C12 (1984)
- HOLLWEG, JOSEPH V. Resonances of Coronal Loops. Joseph V. Hollweg. **277**, 392, 15-B10 (1984)
- Resonant Heating: An Interpretation of Coronal Loop Data. Joseph V. Hollweg and Alphonse C. Sterling. **282**, L31, 78-C6 (1984)
- Alfvénic Resonances on Solar Spicules. Alphonse C. Sterling and Joseph V. Hollweg. **285**, 843, 120-F1 (1984)
- HOLM, A. V. Ultraviolet Spectroscopy of the Dwarf Nova U Geminorum. R. J. Panek and A. V. Holm. **277**, 700, 19-F11 (1984)
- The Dust around R Coronae Borealis Type Stars. J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu. **280**, 228, 51-E3 (1984)
- HOLM, ALBERT V. IUE Observations of Centaurus X-4 during the 1979 May Outburst. William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank. **278**, 270, 27-A1 (1984)
- HOLMAN, GORDON D. A Study of the Evolution of Energetic Electrons in a Solar Flare. Gordon D. Holman, M. R. Kundu, and B. R. Dennis. **276**, 761, 9-G1 (1984)
- HOLT, S. S. Temperature and Elemental Abundances in the Abell Cluster A576 Derived from X-Ray Observations. R. Rothenflug, L. Virgoux, R. F. Mushotzky, and S. S. Holt. **279**, 53, 37-E6 (1984)
- Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt. **280**, 499, 55-C11 (1984)
- HOLZER, THOMAS E. Fast-Mode Magnetohydrodynamic Waves in Coronal Holes and the Solar Wind. Tor Flå, Shadia R. Habbal, Thomas E. Holzer, and Egil Leer. **280**, 382, 53-B4 (1984)
- HONEYCUTT, R. KENT. A Spectroscopic Study and Mass Determination for the Cataclysmic Variable AC Cancri. Eric M. Schlegel, Ronald H. Kaitchuck, and R. Kent Honeycutt. **280**, 235, 51-E10 (1984)
- HOOD, ALAN W. Magnetohydrodynamic Stability of Line-tied Coronal Arcades. II. Shearless Magnetic Fields. Stefano Migliuolo, Peter J. Cargill, and Alan W. Hood. **281**, 413, 65-D5 (1984)
- HOPKINS, JEFFREY L. The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- HORAN, STEPHEN J. The Remarkable Multiple Mode δ Scuti Star BDS 1269A. Bernard J. McNamara and Stephen J. Horan. **282**, 741, 83-B9 (1984)
- HORANYI, M. The Friable Sponge Model of a Cometary Nucleus. M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Korosmezey, K. Kecskemeti, A. F. Nagy, and K. Szego. **278**, 449, 28-G5 (1984)
- HORNE, J. Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)
- HORNSTEIN, J. S. The Helium Abundance of Saturn from Voyager Measurements. B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein. **282**, 807, 83-G8 (1984)
- HOUC, J. R. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Mile, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- Observations of Comet IRAS-Araki-Alcock 1983d. R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer. **278**, L11, 29-C14 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- IRAS Spectra of Planetary Nebulae. S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius. **278**, L33, 29-E7 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Mile, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Mile, and E. Young. **278**, L71, 30-C5 (1984)
- Detection of the [Ne III] 36 Micron Line in the Planetary Nebula NGC 6543. M. A. Shure, J. R. Houck, G. E. Gull, and T. Herter. **281**, L29, 65-G1 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson. **283**, L1, 91-E3 (1984)
- Abundances in Galactic H II Regions. III. G25.4 - 0.2, G45.5 + 0.06, M8, S159, and DR 22. J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones. **285**, 174, 111-G5 (1984)
- The Electron Density in M82 from the S III Mid-Infrared Line Ratio.

- J. R. Houck, M. A. Shure, G. E. Gull, and T. Herter. **287**, L11, 138-C12 (1984)
- The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf. **287**, L15, 138-D1 (1984)
- HOVESTADT, D. Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. G. M. Mason, G. Gloeckler, and D. Hovestadt. **280**, 902, 59-E14 (1984)
- Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ³He-rich Solar Energetic Particle Events. B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk. **281**, 458, 66-A1 (1984)
- Ionic Charge State Measurements during He⁺-rich Solar Particle Events. D. Hovestadt, G. Gloeckler, B. Klecker, and M. Scholer. **281**, 463, 66-A6 (1984)
- Survey of He⁺/He²⁺ Abundance Ratios in Energetic Particle Events. D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer. **282**, L39, 78-C12 (1984)
- HOWARD, R. A. Associations between Coronal Mass Ejections and Metric Type II Bursts. N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels. **279**, 839, 47-A4 (1984)
- HOWARD, R. J. Interpretation of Absolute Line Intensities on the NRAO 11 Meter and Other Millimeter Wave Telescopes. M. L. Kutner, L. Mundy, and R. J. Howard. **283**, 890, 96-E11 (1984)
- HOWARD, ROBERT. Rotation of the Sun Measured from Mount Wilson White-Light Images. Robert Howard, Peter A. Gilman, and Pamela I. Gilman. **283**, 373, 90-A11 (1984)
- Variations in Solar Rotation with the Sunspot Cycle. Peter A. Gilman and Robert Howard. **283**, 385, 90-B14 (1984)
- Limits on Photospheric Doppler Signatures for Solar Giant Cells. Herschel B. Snodgrass and Robert Howard. **284**, 848, 108-C8 (1984)
- HOWARD, W. MICHAEL. The Spectra of X-Ray Bursting Neutron Stars. Richard A. London, Ronald E. Taam, and W. Michael Howard. **287**, L27, 138-D14 (1984)
- HOWARTH, I. D. Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. G. Hammerschlag-Hensberge, T. R. Kallman, and I. D. Howarth. **283**, 249, 88-F8 (1984)
- HOWE, S. K. The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baiy, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- HOWELL, R. R. The T Tauri Radio Source. P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell. **280**, L23, 54-D13 (1984)
- HRIVNAK, B. J. A Search for Radial Velocity Variations in the Blue Stragglers of NGC 7789. L. L. Stryker and B. J. Hrivnak. **278**, 215, 26-C13 (1984)
- Observations, Analysis, and Absolute Parameters of the Evolved Binary AI Phoenixis. B. J. Hrivnak and E. F. Milone. **282**, 748, 83-C3 (1984)
- A Radial Velocity Study of XY Leonis. B. J. Hrivnak, E. F. Milone, G. Hill, and W. A. Fisher. **285**, 683, 119-A4 (1984)
- Observations of the O'Connell Effect System VY Crucis. E. F. Milone and B. J. Hrivnak. **56**, 295, 27-A2 (1984) (Abstr. in **285**, 874, 121-A5)
- HUANG, KE-LIANG. Faint Blue Objects at High Galactic Latitude. IV. Palomar Schmidt Fields Centered on Selected Areas 55 and 94. Ke-Liang Huang and Peter D. Usher. **56**, 393, 28-B1 (1984) (Abstr. in **285**, 875, 121-A6)
- HUANG, Y.-L. Nearby Molecular Clouds. I. Ophiuchus-Sagittarius, $b > 10^\circ$. F. Lebrun and Y.-L. Huang. **281**, 634, 69-D12 (1984)
- HUBICKY, O. A Formula for the Shakura-Sunyaev Turbulent Viscosity Parameter. V. M. Canuto, I. Goldman, and O. Hubickyj. **280**, L55, 60-E6 (1984)
- HUCHRA, J. P. A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccini, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- Groups of Galaxies. III. The CTA Survey: Erratum. M. J. Geller and J. P. Huchra. **54**, 442, 7-F13 (1984) (Orig. paper in **52**, 61, 10-A2)
- HUCHRA, JOHN. The Distances and Properties of a Sample of Sc I Galaxies. Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould. **278**, 475, 31-B9 (1984)
- A Galaxy Cluster behind M87. John Huchra and Jean Brodie. **280**, 547, 55-G4 (1984)
- HUCHRA, JOHN P. The Compact Radio Source 2021 + 614: A Peculiar Narrow-Line Radio Galaxy. Norbert Bartel, Irwin I. Shapiro, John P. Huchra, and Helmut Kühr. **279**, 112, 38-B13 (1984)
- Seven Poor Clusters of Galaxies. Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis. **283**, 33, 86-D3 (1984)
- How to Find Galaxies at High Redshift. Lee W. Hartmann, John P. Huchra, and Margaret J. Geller. **287**, 487, 139-D13 (1984)
- HUEBNER, W. F. Is the Metal Contribution to the Astrophysical Opacity Incorrect? N. H. Magee, Jr., A. L. Merts, and W. F. Huebner. **283**, 264, 88-G10 (1984)
- Discrepancy in the CNO Opacity Bump Resolved. T. R. Carson, W. F. Huebner, N. H. Magee, Jr., and A. L. Merts. **283**, 466, 91-B7 (1984)
- HUEBNER, WALTER F. Synthesis of Complex Molecules in Dense Interstellar Clouds via Gas-Phase Chemistry: A Pseudo Time-dependent Calculation. Chun Ming Leung, Eric Herbst, and Walter F. Huebner. **56**, 231, 25-D7 (1984) (Abstr. in **284**, 870, 108-E2)
- HUGGINS, P. J. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- CN and C₂H in IRC +10216. P. J. Huggins, A. E. Glassgold, and Mark Morris. **279**, 284, 40-B5 (1984)
- HUGHES, JOHN P. A Search for X-Ray Polarization in Cosmic X-Ray Sources. John P. Hughes, Knox S. Long, and Robert Novick. **280**, 255, 51-G2 (1984)
- Interpretation of the Number versus Diameter Distribution for Supernova Remnants in the Large Magellanic Cloud. John P. Hughes, David J. Helfand, and Steven M. Kahn. **281**, L25, 65-F11 (1984)
- HUGHES, V. A. The Star-forming Region in Cepheus A. V. A. Hughes and J. G. A. Wouterloot. **276**, 204, 3-B2 (1984)
- Radio Observations of W Ursae Majoris Stars. V. A. Hughes and B. J. McLean. **278**, 716, 33-F10 (1984)
- Extended Radio Observations of the SNR CTB 109. V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner. **283**, 147, 87-F1 (1984)
- HUMPHREYS, R. M. IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti. **278**, 124, 25-D2 (1984)
- HUMPHREYS, ROBERTA M. The Initial Mass Function for Massive Stars in the Galaxy and the Magellanic Clouds. Roberta M. Humphreys and Douglas B. McElroy. **284**, 565, 105-C6 (1984)
- HUNTER, DEIDRE A. CO Emission from the Star-Burst Irregular Galaxy NGC 1569. Judith S. Young, J. S. Gallagher, and Deidre A. Hunter. **276**, 476, 6-F13 (1984)
- Anomalous Emission Regions in Irregular Galaxies. Deidre A. Hunter. **276**, L35, 10-E7 (1984)
- A Probable Supernova Remnant in the Dwarf Elliptical Galaxy NGC 185. John S. Gallagher III, Deidre A. Hunter, and Jeremy Mould. **281**, L63, 73-A12 (1984)
- Star Formation Histories of Irregular Galaxies. John S. Gallagher III, Deidre A. Hunter, and Alexander V. Tutukov. **284**, 544, 105-A12 (1984)
- A Library of Stellar Spectra. George H. Jacoby, Deidre A. Hunter, and Carol A. Christian. **56**, 257, 25-F6 (1984) (Abstr. in **284**, 870, 108-E2)
- HUNTER, J. H., JR. High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley. **286**, 471, 128-C3 (1984)
- HUNTLEY, J. M. High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley. **286**, 471, 128-C3 (1984)
- HUNTRESS, W. T., JR. The Chemistry of Phosphorus in Dense Interstellar Clouds. L. R. Thorne, V. G. Anicich, S. S. Prasad, and W. T. Huntress, Jr. **280**, 139, 50-E3 (1984)
- HURFORD, G. J. The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis. **279**, 875, 47-D3 (1984)
- HURFORD, GORDON J. Magnetic Changes Observed in a Solar Flare. Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane. **276**, 379, 5-A1 (1984)
- HURLBURT, NEAL E. Two-Dimensional Compressible Convection Extending over Multiple Scale Heights. Neal E. Hurlburt, Juri Toomre, and Joseph M. Massaguer. **282**, 557, 81-B11 (1984)
- HURLEY, K. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zechenko, and V. G. Kurt. **280**, 150, 50-E14 (1984)
- On the Morphology and Spectra of the Short Gamma-Ray Bursts. C. Barat, R. I. Hayes, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zechenko. **285**, 791, 120-B3 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible

- Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. **286**, L5, 126-D7 (1984)
- Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolidze. **286**, L11, 126-D14 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- HURLEY, K. C. Solar Hard X-Ray Microflares. R. P. Lin, R. A. Schwartz, S. R. Kane, R. M. Pelling, and K. C. Hurley. **283**, 421, 90-E13 (1984)
- HUT, PIET. Is There Life after Core Collapse in Globular Clusters? Haldan Cohn and Piet Hut. **277**, L45, 22-E10 (1984)
- Effects of Encounters with Field Stars on the Evolution of Low-Mass Semidetached Binaries. Piet Hut and Bohdan Paczyński. **284**, 675, 106-D6 (1984)
- Hard Binary-Single Star Scattering Cross Sections for Equal Masses. Piet Hut. **55**, 301, 15-B1 (1984) (Abstr. in **280**, 940, 60-B4)
- HUTCHINGS, J. B. Optical Imaging of 78 Quasars and Host Galaxies. J. B. Hutchings, D. Crampton, and Bruce Campbell. **280**, 41, 49-D8 (1984)
- Optical Counterparts for X-Ray Sources in M31. D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck. **284**, 663, 106-C8 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles. **286**, 196, 124-B2 (1984)
- An Atlas of QSO Luminosity Profiles. J. B. Hutchings, D. Crampton, B. Campbell, D. Duncan, and B. Glendenning. **55**, 319, 15-C4 (1984) (Abstr. in **280**, 940, 60-B4)
- HUTTER, D. J. Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- HYLAND, A. R. A Photometric Comparison of Late-Type Cluster Supergiants in the Magellanic Clouds and the Galaxy. P. J. McGregor and A. R. Hyland. **277**, 149, 12-E7 (1984)
- Infrared Mapping of the M87 Jet. N. E. B. Killeen, G. V. Bicknell, A. R. Hyland, and T. J. Jones. **280**, 126, 50-D3 (1984)
- The Inner Core of a Bok Globule. Terry Jay Jones, A. R. Hyland, and Jeremy Bailey. **282**, 675, 82-D5 (1984)
- IBÁÑEZ, J. M^a. Collapse of Anisotropic Spheres in General Relativity: An Analytical Model. J. M^a. Ibáñez. **284**, 381, 102-B4 (1984)
- IBÁÑEZ S., MIGUEL H. The Equilibrium of Polytropic Self-gravitating Sheetlike Masses. Miguel H. Ibáñez S. and Leonardo di G. Sigalotti. **285**, 784, 120-A10 (1984)
- IBEN, ICKO, JR. On the Frequency of Planetary Nebula Nuclei Powered by Helium Burning and on the Frequency of White Dwarfs with Hydrogen-deficient Atmospheres. Icko Iben, Jr. **277**, 333, 14-E4 (1984)
- Thermal Evolution of Accreting Neutron Stars. Masayuki Y. Fujimoto, Tomoyuki Hanawa, Icko Iben, Jr., and M. B. Richardson. **278**, 813, 34-F13 (1984)
- Cooling of Low-Mass Carbon-Oxygen Dwarfs from the Planetary Nucleus Stage through the Crystallization Stage. Icko Iben, Jr. and Alexander V. Tutukov. **282**, 615, 81-F13 (1984)
- The Evolution of Low-Mass Close Binaries Influenced by the Radiation of Gravitational Waves and by a Magnetic Stellar Wind. Icko Iben, Jr. and Alexander V. Tutukov. **284**, 719, 106-G8 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè. **287**, 749, 142-D14 (1984)
- Supernovae of Type I as End Products of the Evolution of Binaries with Components of Moderate Initial Mass ($M \leq 9 M_{\odot}$). Icko Iben, Jr. and Alexander V. Tutukov. **54**, 335, 6-A1 (1984) (Abstr. in **276**, 800, 10-B12)
- ICHIMARU, SETSUO. Electrical and Thermal Conductivities of Dense Matter in the Liquid Metal Phase. II. Low-Temperature Quantum Corrections. Shinichi Mitake, Setsuo Ichimaru, and Naoki Itoh. **277**, 375, 15-A4 (1984)
- Screening Potential Enhancement of Thermonuclear Reaction Rate due to Relativistic Degenerate Electrons in Dense Multi-ionic Plasmas. Setsuo Ichimaru and Kenichi Utsumi. **278**, 382, 28-B5 (1984)
- Enhancement of Thermonuclear Reaction Rate due to Screening by Relativistic Degenerate Electrons: Long-Range Correlation Effect. Setsuo Ichimaru and Kenichi Utsumi. **286**, 363, 125-G6 (1984)
- IKEUCHI, SATORU. Formation of Dissipative Structures in Galaxies. Toshiya Nozakura and Satoru Ikeuchi. **279**, 40, 37-D5 (1984)
- Scattering of Shock Waves by a Spherical Cloud. Satoru Ikeuchi and Lyman Spitzer, Jr. **283**, 825, 96-A1 (1984)
- Lateral Propagation of the Helium Shell Flash on an Accreting Neutron Star. Toshiya Nozakura, Satoru Ikeuchi, and Masayuki Y. Fujimoto. **286**, 221, 124-C13 (1984)
- ILLING, RAINER M. E. The Complex Coronal Transient of 1980 March 23. Rainer M. E. Illing. **280**, 399, 53-C7 (1984)
- ILOVAISKY, S. 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. **286**, L5, 126-D7 (1984)
- IMAMURA, JAMES N. A Numerical Study of the Stability of Radiative Shocks. James N. Imamura, Michael T. Wolff, and Richard H. Durisen. **276**, 667, 8-G2 (1984)
- Colliding Winds: Interaction Regions with Strong Heat Conduction. James N. Imamura and Roger A. Chevalier. **280**, 313, 52-D5 (1984)
- Comparison of the X-Ray Observations of the AM Herculis Objects to Theory. James N. Imamura. **285**, 223, 112-D2 (1984)
- INATANI, JUNJI. CS around Orion-KL: A Large Rotating Disk. Tetsuo Hasegawa, Norio Kaiju, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane. **283**, 117, 87-C10 (1984)
- INGUSCIO, MASSIMO. The Direct Measurement of the $3^3P_0-3^3P_1$ Fine-Structure Interval and the g_J -Factor of Atomic Silicon by Laser Magnetic Resonance. Massimo Inguscio, K. M. Evenson, Virgilio Beltrán-López, and Eugenio Ley-Koo. **278**, L127, 36-D9 (1984)
- INOUE, H. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- IONSON, JAMES A. A Unified Theory of Electrodynamical Coupling in Coronal Magnetic Loops: The Coronal Heating Problem. James A. Ionsen. **276**, 357, 4-F3 (1984)
- Black Hole Accretion Disks: Coronal Stabilization of the Lightman-Eardley Instability. James A. Ionsen and Max Kuperus. **284**, 389, 102-B12 (1984)
- IP, WING-H. A Radio Source Occultation Experiment with Comet Austin 1982g, with Unusual Results. Imke de Pater and Wing-H. Ip. **283**, 895, 96-F2 (1984)
- IPAVICH, F. M. Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk. **281**, 458, 66-A1 (1984)
- Survey of $\text{He}^+/\text{He}^{2+}$ Abundance Ratios in Energetic Particle Events. D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer. **282**, L39, 78-C12 (1984)
- IPSER, JAMES R. On the Emission of Gravitational Radiation from Inhomogeneous Jacobi Configurations. James R. Ipser and Robert A. Matzner. **282**, 287, 77-A8 (1984)
- IRVINE, WILLIAM M. The Detection of Interstellar Methylcyanoacetylene. N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarson. **276**, L25, 5-F14 (1984)
- Cyanide and Isocyanide Abundances in the Cold, Dark Cloud TMC-1. William M. Irvine and F. Peter Schloerb. **282**, S16, 80-F12 (1984)
- ISAACMAN, RICHARD B. Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. Trinh X. Thuan, Roger A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen. **285**, 515, 117-B6 (1984)
- ISRAEL, F. P. On the Correlation of CO Line and Radio Continuum

- Emission in Nearby Galaxies and the Efficiency of OB Star Formation. *F. P. Israel and M. Rowan-Robinson*. **283**, 81, 87-A2 (1984)
- ITOHI, HIROSHI. Temperature Relaxation in Supernova Remnants. Revisited. *Hiroshi Itoh*. **285**, 601, 118-C7 (1984)
- ITOHI, NAOIKI. Electrical and Thermal Conductivities of Dense Matter in the Liquid Metal Phase. II. Low-Temperature Quantum Corrections. *Shinichi Mitake, Setsuo Ichimaru, and Naoki Itoh*. **277**, 375, 15-A4 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. *Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuhiro Kohyama*. **279**, 413, 41-D10 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections in the Liquid Metal Phase. *Naoki Itoh, Yasuhiro Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **280**, 787, 58-D9 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. *Naoki Itoh, Yasuhiro Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 304, 113-C2 (1984)
- Electrical and Thermal Conductivities of Dense Matter in the Crystalline Lattice Phase. *Naoki Itoh, Yasuhiro Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 758, 119-F12 (1984)
- IWASHITA, HIROYUKI. CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane*. **283**, 117, 87-C10 (1984)
- JACKSON, JAMES M. HNCO in Molecular Clouds. *James M. Jackson, J. Thomas Armstrong, and Alan H. Barrett*. **280**, 608, 56-D13 (1984)
- JACOBSON, A. S. HEAO 3 Observations of the Crab Pulsar. *W. A. Mahoney, J. C. Ling, and A. S. Jacobson*. **278**, 784, 34-D12 (1984)
- HEAO 3 Discovery of ^{26}Al in the Interstellar Medium. *W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson*. **286**, 578, 129-D14 (1984)
- JACOBSON, ALLAN S. Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the HEAO 3 Gamma-Ray Spectrometer. *Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson*. **281**, 566, 68-F8 (1984)
- JACOBY, GEORGE H. The Extragalactic Nature of H0323 + 022. *Bruce Margon and George H. Jacoby*. **286**, L31, 132-D2 (1984)
- A Library of Stellar Spectra. *George H. Jacoby, Deidre A. Hunter, and Carol A. Christian*. **56**, 257, 25-F6 (1984) (Abstr. in **284**, 870, 108-E2)
- JAFFE, D. T. Far-Infrared and Submillimeter Observations of the Low-Luminosity Protostars L1455 FIR and L1551 IRS 5: The Confinement of Bipolar Outflows. *J. A. Davidson and D. T. Jaffe*. **277**, L13, 16-A13 (1984)
- The Massive Core of W51. *D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand*. **279**, L51, 48-B8 (1984)
- Far-Infrared Selected Star Formation Regions. *D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran*. **281**, 225, 63-D1 (1984)
- Far-Infrared and CO Observations of the W33 Complex. *M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino*. **283**, 573, 93-B4 (1984)
- Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. *D. T. Jaffe, J. A. Davidson, M. Dragoon, and R. H. Hildebrand*. **284**, 637, 106-A10 (1984)
- Submillimeter Continuum Observations of M82. *D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand*. **285**, L31, 115-A2 (1984)
- JAFFE, WALTER J. Very Large Array Observations of Jupiter's Nonthermal Radiation. *Imke de Pater and Walter J. Jaffe*. **54**, 405, 7-C10 (1984) (Abstr. in **277**, 908, 22-A9)
- JANES, KENNETH A. The Population Structure of the Large Magellanic Cloud Bar. *Eduardo Hardy, Roberto Buonanno, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer*. **278**, 592, 32-D3 (1984)
- JARVIS, JOHN F. Galaxy Mass Distribution from Gravitational Light Deflection. *J. Anthony Tyson, Francisco Valdes, John F. Jarvis, and Allen P. Mills, Jr.*. **281**, L59, 73-A8 (1984)
- JAUNCEY, DAVID L. Redshifts of Southern Radio Sources. VI. *David L. Jauncey, Michael J. Batt, Alan E. Wright, Bruce A. Peterson, and Ann Savage*. **286**, 498, 128-E8 (1984)
- JEFFRIES, J. T. Observations of the Brightness Profile of the Sun in the 30–200 Micron Continuum. *C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gaulty*. **281**, 862, 71-G11 (1984)
- JENKINS, C. R. Arp 91: Interaction and Star Formation in a Galaxy Pair. *C. R. Jenkins*. **277**, 501, 17-E5 (1984)
- JENKINS, EDWARD B. High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. *Edward B. Jenkins, George Wallerstein, and Joseph Silk*. **278**, 649, 33-A12 (1984)
- Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). *Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York*. **281**, 585, 69-A5 (1984)
- JENNINGS, D. E. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. *S. J. Daut, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J.-Susskind, and J. W. Brault*. **280**, 921, 59-G9 (1984)
- The $v = 0 \rightarrow 0$ Spectrum of H_2 . *D. E. Jennings, S. L. Bragg, and J. W. Brault*. **282**, L85, 85-D2 (1984)
- JENNINGS, R. E. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- Far-Infrared Observations of the Crab Nebula. *P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olon*. **278**, L29, 29-E3 (1984)
- IRAS Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olon, and P. R. Wesselius*. **278**, L33, 29-E7 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. *C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young*. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46–47. *J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius*. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. *B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius*. **278**, L53, 29-F12 (1984)
- IRAS Images of the Galactic Center. *T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden*. **278**, L57, 29-G4 (1984)
- JENSEN, KENNETH A. Boundary Layers in Cataclysmic Variables: The HEAO 1 X-Ray Constraints. *Kenneth A. Jensen*. **278**, 277, 27-A10 (1984)
- JERNIGAN, J. G. Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 – 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, F. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- JEWELL, JACK. An Atlas of Late-Type Stellar Spectra, 2400–2778 Inverse Centimeters. *Stephen T. Ridgway, Duane F. Carbon, Donald N. B. Hall, and Jack Jewell*. **54**, 177, 4-A2 (1984) (Abstr. in **276**, 798, 10-B10)
- JEWELL, P. R. Observations and Analysis of Circumstellar Cyanoacetylene. *P. R. Jewell and L. E. Snyder*. **278**, 176, 26-A1 (1984)
- JOG, CHANDA J. Two-Fluid Gravitational Instabilities in a Galactic Disk. *Chanda J. Jog and P. M. Solomon*. **276**, 114, 2-B9 (1984)
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. *Chanda J. Jog and P. M. Solomon*. **276**, 127, 2-C8 (1984)
- JOHANSSON, L. E. B. Thermal and Maser Molecular Lines from the Envelope of IRC +10216. *Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner*. **286**, 276, 125-A1 (1984)
- JOHNSON, B. CAROL. The Radiative Lifetime of the $^2\text{S}^{\circ}$ Metastable Level of O^{++} . *B. Carol Johnson, Peter L. Smith, and R. D. Knight*. **281**, 477, 65-B6 (1984)
- JOHNSON, D. R. Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson*. **276**, 572, 7-G4 (1984)
- SiO Flux Measurements of Variable Stars. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson*. **283**, 174, 88-A2 (1984)
- JOHNSON, H. R. The H^- Flux Peak and the Hydrogen Abundance in N Type Carbon Stars. *J. H. Goebel and H. R. Johnson*. **284**, L39, 109-B9 (1984)
- JOHNSON, HOLLIS R. Line Identifications in the Ultraviolet (2590–3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. *Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton*. **283**, 760, 95-C2 (1984)
- Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. *David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson*.

- 284, 223, 100-D14 (1984)
- JOHNSON, R. E. Ejection of Atoms and Molecules from Io by Plasma-Ion Impact. *E. M. Sieveka and R. E. Johnson*. **287**, 418, 137-D12 (1984)
- JOHNSTON, K. High-Resolution Observations of the Steep Spectrum Source 2147 + 145. *W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Bååth, and J. Romney*. **277**, L41, 22-E6 (1984)
- JOHNSTON, K. J. Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. *J. M. Benson and K. J. Johnston*. **277**, 181, 13-A1 (1984)
- Rapid Radio Variations in the Flux Density of BL Lacertae. *K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Josties, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis*. **277**, L30, 22-D11 (1984)
- The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. *K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus*. **280**, 542, 55-F13 (1984)
- Ammonia Absorption toward NGC 7538 IRS 1: 2 Arc Second Observations in the (3,3) Line. *C. Henkel, T. L. Wilson, and K. J. Johnston*. **282**, L93, 85-D10 (1984)
- Ultracompact Structure in the H II Region W49N. *J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker*. **283**, 632, 93-G6 (1984)
- 2_{11-212} Formaldehyde Emission from DR 21(OH). *K. J. Johnston, C. Henkel, and T. L. Wilson*. **285**, L85, 121-G7 (1984)
- JOHNSTON, M. D. Explosive Nucleosynthesis in Massive Stars: Comparison with the Cassiopeia A Fast-moving Knots. *M. D. Johnston and A. Yahil*. **285**, 587, 118-A4 (1984)
- JONCAS, GILLES. Kinematics and Dynamics of the H II Region Sharpless 142. I. The Velocity Field of the Ionized Hydrogen. *Gilles Joncas and Jean-René Roy*. **283**, 640, 94-A1 (1984)
- JONES, B. Abundances in Galactic H II Regions. III. G25.4 - 0.2, G45.5 + 0.06, M8, S159, and DR 22. *J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones*. **285**, 174, 111-G5 (1984)
- Position-dependent Infrared Spectroscopy of M82: 100,000 Orion Nebulae? *B. Jones and J. M. Rodriguez-Espinoza*. **285**, 580, 117-G11 (1984)
- JONES, BERNARD J. T. The Infrared Ca II Triplet: A Luminosity Indicator for Stellar Population Synthesis. *Janet E. Jones, Danielle M. Alloin, and Bernard J. T. Jones*. **283**, 457, 91-A11 (1984)
- Rotation and Surface Brightness in Elliptical Galaxies. *Rosemary F. G. Wyse and Bernard J. T. Jones*. **286**, 88, 122-G8 (1984)
- JONES, C. The Structure of Clusters of Galaxies Observed with Einstein. *C. Jones and W. Forman*. **276**, 38, 1-D1 (1984)
- Clusters of Galaxies as a Probe of the Intergalactic Medium. *W. Forman, C. Jones, and W. Tucker*. **277**, 19, 11-B10 (1984)
- The Prevalence of Cooling Flows in Clusters of Galaxies. *G. C. Stewart, A. C. Fabian, C. Jones, and W. Forman*. **285**, 1, 110-A6 (1984)
- JONES, DAYTON L. Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. *Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer*. **276**, 480, 6-G3 (1984)
- The Radio Structure of CTA 21. *Dayton L. Jones*. **276**, L5, 5-E5 (1984)
- The Sub-Milliarcescond Radio Structure of AO 0235 + 164. *Dayton L. Jones, Lars B. Bååth, Michael M. Davis, and Stephen C. Unwin*. **284**, 60, 98-E9 (1984)
- A Search for Changing Structure in Low-Luminosity Compact Radio Sources. *Dayton L. Jones*. **287**, 33, 133-C12 (1984)
- JONES, HARRISON P. Magnetic Changes Observed in a Solar Flare. *Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane*. **276**, 379, 5-A1 (1984)
- JONES, JANET E. The Infrared Ca II Triplet: A Luminosity Indicator for Stellar Population Synthesis. *Janet E. Jones, Danielle M. Alloin, and Bernard J. T. Jones*. **283**, 457, 91-A11 (1984)
- JONES, T. J. Infrared Mapping of the M87 Jet. *N. E. B. Killeen, G. V. Bicknell, A. R. Hyland, and T. J. Jones*. **280**, 126, 50-D3 (1984)
- JONES, T. W. MHD Kelvin-Helmholtz Instability in Extended Radio Jets. *Ralph Fielder and T. W. Jones*. **283**, 532, 92-F1 (1984)
- JONES, TERRY JAY. The Inner Core of a Bok Globule. *Terry Jay Jones, A. R. Hyland, and Jeremy Bailey*. **282**, 675, 82-D5 (1984)
- JORDAN, C. High-Resolution; Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. *A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres*. **283**, 731, 95-A1 (1984)
- JOSS, P. C. The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. *J. H. Krolik, A. Meiksin, and P. C. Joss*. **282**, 466, 80-C4 (1984)
- The Lower Main Sequence and the Nature of Secondary Stars in Ultracompact Binaries. *S. Rappaport and P. C. Joss*. **283**, 232, 88-E5 (1984)
- JOSTIES, F. J. Rapid Radio Variations in the Flux Density of BL Lacertae. *K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Josties, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis*. **277**, L30, 22-D11 (1984)
- Photographic Measures of Double Stars. *F. J. Josties and R. S. Harrington*. **54**, 103, 2-D5 (1984) (Abstr. in **275**, 928, 147-F1)
- Joy, M. The Formation of Massive Stars along the W5 Ionization Front. *B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering*. **279**, 291, 40-B12 (1984)
- Joy, MARSHALL. Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. *Paul M. Harvey, Bruce A. Wilking, and Marshall Joy*. **278**, 156, 25-F8 (1984)
- Infrared and Millimeter-Wave Observations of the Sharpless 156 Molecular Cloud. *Marshall Joy, Neal J. Evans II, Paul M. Harvey, and Bruce A. Wilking*. **284**, 161, 99-G5 (1984)
- Far-Infrared Photometry of Compact Extragalactic Sources: OJ 287 and BL Lacertae. *Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking*. **287**, L9, 138-C10 (1984)
- JOYCE, R. R. Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. *D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga*. **284**, 799, 107-F8 (1984)
- JURA, M. Multiple Circumstellar Shells and Radiation Pressure on Grains in the Outflow from Late-Type Stars. *M. Jura*. **282**, 200, 76-B4 (1984)
- Mass Loss from Red Giants: A Simple Evolutionary Model for NGC 7027. *M. Jura*. **286**, 630, 130-A14 (1984)
- X-Rays from Accretion of Red Giant Winds. *M. Jura and D. J. Helfand*. **287**, 785, 142-G8 (1984)
- JURA, MICHAEL. The Microwave Background Temperature at 2.64 and 1.32 Millimeters. *David M. Meyer and Michael Jura*. **276**, L1, 5-E2 (1984)
- KAHN, S. M. Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. *F. A. Cordova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire*. **278**, 739, 34-A9 (1984)
- Short-Term X-Ray Variability of the Globular Cluster Source 4U 1820 - 30 (NGC 6624). *L. Stella, S. M. Kahn, and J. E. Grindlay*. **282**, 713, 82-G4 (1984)
- Evidence for 4.4 Hour Periodic Dips in the X-Ray Flux from 4U 1755-33. *N. E. White, A. N. Parmar, M. Sztajno, H. U. Zimmermann, K. O. Mason, and S. M. Kahn*. **283**, L9, 91-E11 (1984)
- KAHN, STEVEN M. An X-Ray Study of the Remnant of SN 185 A.D. *Ryszard L. Pisarski, David J. Helfand, and Steven M. Kahn*. **277**, 710, 19-G7 (1984)
- Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. *Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman*. **278**, 255, 26-F11 (1984)
- Einstein Observations of the Cygnus Loop. *William H.-M. Ku, Steven M. Kahn, Ryszard Pisarski, and Knox S. Long*. **278**, 615, 32-E13 (1984)
- Evidence for Weak X-Ray Burst Emission from Cygnus X-2 and GX 17 + 2. *Steven M. Kahn and Jonathan E. Grindlay*. **281**, 826, 71-E3 (1984)
- Interpretation of the Number versus Diameter Distribution for Supernova Remnants in the Large Magellanic Cloud. *John P. Hughes, David J. Helfand, and Steven M. Kahn*. **281**, L25, 65-F11 (1984)
- High-Resolution Soft X-Ray Spectra of Scorpius X-1: The Structure of Circumsource Accreting Material. *Steven M. Kahn, Frederick D. Seward, and Tomasz Chlebowski*. **283**, 286, 89-B7 (1984)
- KAIFU, N. Detection of U45.379: An Intense, Peculiar Unidentified Line. *H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito*. **282**, 197, 76-B1 (1984)
- KAIFU, NORIO. CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane*. **283**, 117, 87-C10 (1984)
- KAINER, SELIG. The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. *William K. Rose, John Guillory, James H. Beall, and Selig Kainer*. **280**, 550, 55-G8 (1984)
- KAISER, NICK. Minimal Anisotropy of the Microwave Background Radiation in the Gravitational Instability Picture. *Nick Kaiser*. **282**, 374, 79-B4 (1984)
- On the Spatial Correlations of Abell Clusters. *Nick Kaiser*. **284**, L9, 103-A10 (1984)
- KAITCHUCK, RONALD H. A Spectroscopic Study and Mass Determination for the Cataclysmic Variable AC Cancri. *Eric M. Schlegel, Ronald H. Kaitchuck, and R. Kent Honeycutt*. **280**, 235, 51-E10 (1984)
- KALER, JAMES B. The O VI Nucleus of the Planetary Nebula M3-30. *James B. Kaler and Richard A. Shaw*. **278**, 195, 26-B6 (1984)
- The Central Star of the Planetary Nebula Abell 78. *James B. Kaler and Walter A. Feibelman*. **282**, 719, 83-A1 (1984)
- KALKOFEN, W. Apparent Solar Temperature Enhancement due to Large-Amplitude Waves. *W. Kalkofen, P. Ulmschneider, and F. Schmitz*. **287**, 952, 144-E11 (1984)

- KALLMAN, T. R. X-Ray Nebular Models. II. Constant Pressure Clouds. *T. R. Kallman*. **280**, 269, 52-A3 (1984)
- Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. *G. Hammerschlag-Hensberge, T. R. Kallman, and I. D. Howarth*. **283**, 249, 88-F8 (1984)
- KALLMAN, TIMOTHY R. Spectral Variability in Early-Type Binary X-Ray Systems. *Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson*. **282**, 245, 76-E7 (1984)
- Soft X-Ray Opacity in Hot and Photoionized Gases. *Julian H. Krolik and Timothy R. Kallman*. **286**, 366, 125-G9 (1984)
- KALRA, G. L. Wave-Wave Interaction in Magneto-gravitating Plasma. *S. S. Aggarwal and G. L. Kalra*. **280**, 792, 58-D14 (1984)
- KAMINSKI, C. Temporal Variations in the Solar Submillimeter Continuum. *C. Lindsey and C. Kaminski*. **742**, L103, 85-E5 (1984)
- KAMPER, KARL W. The Expansion Age of the Supernova Remnant RCW 89 = MSH 15 - 52 (G320.4 - 1.2). *Sidney van den Bergh and Karl W. Kamper*. **280**, L51, 60-E1 (1984)
- KANDRUP, HENRY E. An Exact Closed Equation for the Cosmological Pair Correlation. *Henry E. Kandrup and Susan Hill Kandrup*. **277**, 1, 11-A6 (1984)
- Gravitational Clustering for a Multicomponent System with a Distribution of Temperatures. *Henry E. Kandrup*. **286**, 15, 122-B5 (1984)
- KANDRUP, SUSAN HILL. An Exact Closed Equation for the Cosmological Pair Correlation. *Henry E. Kandrup and Susan Hill Kandrup*. **277**, 1, 11-A6 (1984)
- KANE, S. R. Solar Hard X-Ray Microflares. *R. P. Lin, R. A. Schwartz, S. R. Kane, R. M. Pelling, and K. C. Hurley*. **283**, 421, 90-E13 (1984)
- KANE, SHARAD R. Magnetic Changes Observed in a Solar Flare. *Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane*. **276**, 379, 5-A1 (1984)
- KÄPPELER, F. The s-Process Branching at ^{151}Sm . *H. Beer, F. Käppeler, K. Yokoi, and K. Takahashi*. **278**, 388, 28-B11 (1984)
- Neutron Capture Nucleosynthesis of Neodymium Isotopes and the s-Process from $A = 130$ to 150 . *G. J. Mathews and F. Käppeler*. **286**, 810, 132-A1 (1984)
- KAR, JAYANTA. On Stellar Models with an Isothermal Core in the Presence of a Magnetic Field. *M. K. Das, Jayanta Kar, and J. N. Tandon*. **281**, 292, 64-B4 (1984)
- KAR, K. Electron Capture Supernovae: One-Zone Collapse Calculation for Stars with Masses $10 M_{\odot}$ and $15 M_{\odot}$. *A. Ray, S. M. Chitre, and K. Kar*. **285**, 766, 119-G6 (1984)
- KARIMABADI, H. The Detectability of Population III "Jupiters". *H. Karimabadi and L. Blitz*. **283**, 169, 87-G11 (1984)
- KARP, A. H. A High-Order Spherical Harmonics Solution to the Standard Problem in Radiative Transfer. *M. Benassi, R. D. M. Garcia, A. H. Karp, and C. E. Siewert*. **280**, 853, 59-B5 (1984)
- KARPEN, JUDITH T. Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. *Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek*. **286**, 787, 131-F6 (1984)
- Detailed Studies of the Dynamics and Energetics of Coronal Bullets. *Judith T. Karpen, Elaine S. Oran, and Jay P. Boris*. **287**, 396, 137-C4 (1984)
- KASTNER, S. O. On Bowen Enhancement of the N III Spectrum under Solar and Nebulae Conditions. *S. O. Kastner and A. K. Bhatia*. **287**, 945, 144-E4 (1984)
- KATTENBERG, ARIE. Flares in Hale 17760: Simultaneous Microwave Spectra and Images of the Flare of 1981 July 27. *Arie Kattenberg*. **283**, 398, 90-C13 (1984)
- KAWABE, R. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow Source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto*. **282**, L73, 85-C6 (1984)
- KAYSER, SUSAN E. The Far Reaches of the Solar Wind: Pioneer 10 and Pioneer 11 Plasma Results. *Susan E. Kayser, Aaron Barnes, and John D. Mihalov*. **285**, 339, 113-E13 (1984)
- KAZANAS, DEMOSTHENES. Photon-Photon Absorption and the Uniqueness of the Spectra of Active Galactic Nuclei. *Demosthenes Kazanas*. **287**, 112, 134-B10 (1984)
- KECSKEMETI, K. The Friable Sponge Model of a Cometary Nucleus. *M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Korosmezey, K. Kecskemeti, A. F. Nagy, and K. Szego*. **278**, 449, 28-G5 (1984)
- KEEL, WILLIAM C. Optical Spectrophotometry of the M87 Jet and Its Environs. *William C. Keel*. **279**, 550, 43-G7 (1984)
- Induced Nuclear Emission-Line Activity in Interacting Spiral Galaxies. *Robert C. Kennicutt, Jr. and William C. Keel*. **279**, L5, 42-D7 (1984)
- Optical Properties of Spiral Galaxies with Strong Nuclear Radio Sources: Active Nuclei, Starbursts, and Composite Objects. *William C. Keel*. **282**, 75, 74-F13 (1984)
- Very Low Luminosity Active Galaxies and the X-Ray Background. *Martin Elvis, Andrzej Soltan, and William C. Keel*. **283**, 479, 92-A13 (1984)
- KEENAN, F. P. The Nitrogen-deficient Cluster NGC 6231. *F. P. Keenan, P. J. F. Brown, P. L. Dufton, and D. J. Lennon*. **279**, L11, 42-D12 (1984)
- Observational Evidence for Non-Maxwellian Electron Energy Distributions in the Solar Transition Region. *P. L. Dufton, A. E. Kingston, and F. P. Keenan*. **280**, L35, 54-E11 (1984)
- KEENE, JOCELYN. Far-Infrared Selected Star Formation Regions. *D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran*. **281**, 225, 63-D1 (1984)
- KEIL, S. L. On the Rotation Rate of Polar Features in the Sun. *B. R. Durney, S. L. Keil, and D. M. Lytle*. **281**, 455, 65-G10 (1984)
- KEIL, STEPHEN L. Variations in the Solar Calcium K Line 1976-1982. *Stephen L. Keil and Simon P. Worden*. **276**, 766, 9-G6 (1984)
- Time-resolved Spectral Observations of Spicule Velocities at Several Heights. *S. Sirajul Hasan and Stephen L. Keil*. **283**, L75, 97-D11 (1984)
- KELLERMANN, K. I. Limits to the Small-Scale Fluctuations in the Cosmic Background Radiation. *E. B. Fomalont, K. I. Kellermann, and J. V. Wall*. **277**, L23, 22-D4 (1984)
- KELLOGG, STEPHEN E. On the Half-Life of ^{180}Ta in Stellar Environments. *Eric B. Norman, Stephen E. Kellogg, Timothy Bertram, Salvador Gil, and Peter Wong*. **281**, 360, 64-G8 (1984)
- KELSALL, T. Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. *M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall*. **283**, 566, 93-A10 (1984)
- Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^{\circ}$ to $l = +62^{\circ}$: Structure and Energetics of the Inner Disk. *M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung*. **285**, 74, 110-F14 (1984)
- KEMP, JAMES C. Induced Atomic Orientation, An Efficient Mechanism for Magnetic Circular Polarization. *James C. Kemp, Joseph H. Macek, and Frederick W. Nehring*. **278**, 863, 35-C9 (1984)
- KEMPER, E. WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? *M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne*. **282**, 763, 83-D4 (1984)
- KENNEL, C. F. Confinement of the Crab Pulsar's Wind by Its Supernova Remnant. *C. F. Kennel and F. V. Coroniti*. **283**, 694, 94-E2 (1984)
- Magnetohydrodynamic Model of Crab Nebula Radiation. *C. F. Kennel and F. V. Coroniti*. **283**, 710, 94-F4 (1984)
- KENNEY, JEFFREY. CO Emission from IRAS Galaxies. *Judith S. Young, Jeffrey Kenney, Steven D. Lord, and F. Peter Schloerb*. **287**, L65, 145-C14 (1984)
- KENNICUTT, ROBERT C., JR. Constraints on the Masses of Supernova Progenitors. *Robert C. Kennicutt, Jr.*. **277**, 361, 14-G4 (1984)
- Induced Nuclear Emission-Line Activity in Interacting Spiral Galaxies. *Robert C. Kennicutt, Jr. and William C. Keel*. **279**, L5, 42-D7 (1984)
- Structural Properties of Giant H II Regions in Nearby Galaxies. *Robert C. Kennicutt, Jr.*. **287**, 116, 134-B14 (1984)
- KENT, STEPHEN M. CCD Surface Photometry of Field Galaxies. I. Observations. *Stephen M. Kent*. **56**, 105, 23-B5 (1984) (Abstr. in **283**, 907, 96-F14)
- KENYON, SCOTT J. The Nature of Symbiotic Stars. *Scott J. Kenyon and Ronald F. Webbink*. **279**, 252, 39-F14 (1984)
- KEPHART, T. W. Spacetime Thermodynamics and the Inflationary Universe. *T. W. Kephart, Y. J. Ng, and H. van Dam*. **277**, 478, 17-C10 (1984)
- KEPLER, S. O. The ZZ Ceti Star GD 385 Revisited. *S. O. Kepler*. **278**, 754, 34-B10 (1984)
- Light and Line Profile Variations due to r-Mode Pulsations with an Application to the ZZ Ceti Star G117-B15A. *S. O. Kepler*. **286**, 314, 125-C13 (1984)
- KEYES, CHARLES D. Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. *Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes*. **280**, 615, 56-E7 (1984)
- Rapid Intensity Variability in the Jets of SS 433. *Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes*. **281**, 313, 64-C13 (1984)
- KHALIULLIN, KH. F. Ultraviolet Photometry from the Orbiting Astronomical Observatory XXXIX. The Structure of the Eclipsing Wolf-Rayet Binary V444 Cygni as Derived from Light Curves between 2460 Å and 3.5 Microns. *A. M. Cherepashchuk, Joel A. Eaton, and Kh. F. Khaliullin*. **281**, 774, 71-A4 (1984)
- KIDMAN, RUSSELL B. Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. *Sumner Starrfield,*

- Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell. **281**, 800, 71-C4 (1984)
- KII, T. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- KILLEEN, N. E. B. Infrared Mapping of the M87 Jet. N. E. B. Killeen, G. V. Bicknell, A. R. Hyland, and T. J. Jones. **280**, 126, 50-D3 (1984)
- KING, IVAN R. Surface Photometry in Cores of Globular Clusters. S. Djorgovski and Ivan R. King. **277**, L49, 22-E14 (1984)
- KINGSTON, A. E. Electron Excitation Rate Coefficients for Transitions from the $1s^2\ ^1S$ Ground State to the $1s2s\ ^1S$ and $1s2p\ ^1P^o$ Excited States of Helium. K. M. Aggarwal, A. E. Kingston, and M. R. C. McDowell. **278**, 874, 35-D6 (1984)
- Observational Evidence for Non-Maxwellian Electron Energy Distributions in the Solar Transition Region. P. L. Dufton, A. E. Kingston, and F. P. Keenan. **280**, L35, 54-E11 (1984)
- KIPLINGER, A. L. The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis. **279**, 875, 47-D3 (1984)
- KIPLINGER, ALAN L. A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. Todd A. Gunkler, Richard C. Canfield, Loren W. Acton, and Alan L. Kiplinger. **285**, 835, 120-E7 (1984)
- Fast Variations in High-Energy X-Rays from Solar Flares and Their Constraints on Nonthermal Models. Alan L. Kiplinger, B. R. Dennis, K. J. Frost, and L. E. Orwig. **287**, L105, 145-F13 (1984)
- KIRK, J. G. Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway. **278**, 369, 28-A6 (1984)
- KIRKMAN, I. W. Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley. **286**, L35, 132-D6 (1984)
- KIRSHNER, ROBERT P. Near-Infrared Spectrophotometry of Crab Nebula Filaments. Richard B. C. Henry, Gordon M. MacAlpine, and Robert P. Kirshner. **278**, 619, 32-F8 (1984)
- An Optical Investigation of the Peculiar Supernova Remnant CTB 80. William P. Blair, Robert P. Kirshner, Robert A. Fesen, and Theodore R. Gull. **282**, 161, 75-F6 (1984)
- KLEBESADEL, R. 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilvovskiy, and C. Motch. **286**, L5, 126-D7 (1984)
- KLEBESADEL, R. W. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt. **280**, 150, 50-E14 (1984)
- 3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz. **286**, 681, 130-E9 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov. **286**, L1, 126-D2 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- KLECKER, B. Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk. **281**, 458, 66-A1 (1984)
- Ionic Charge State Measurements during He^+ -rich Solar Particle Events. D. Hovestadt, G. Gloeckler, B. Klecker, and M. Scholer. **281**, 463, 66-A6 (1984)
- Survey of $\text{He}^+/\text{He}^{2+}$ Abundance Ratios in Energetic Particle Events. D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer. **282**, L39, 78-C12 (1984)
- KLEIN, M. J. 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann. **283**, 106, 87-B13 (1984)
- KLEIN, RICHARD I. Radiatively Driven Dust-bounded Implosion: Formation and Stability of Dense Globules. Maxwell T. Sandford II, Rodney W. Whitaker, and Richard I. Klein. **282**, 178, 75-G10 (1984)
- KLEINER, S. C. Large-Scale Structure of the Taurus Molecular Complex. I. Density Fluctuations—A Fossil Jeans Length? S. C. Kleiner and R. L. Dickman. **286**, 255, 124-F6 (1984)
- KLEPCZYNSKI, W. J. Rapid Radio Variations in the Flux Density of BL Lacertae. K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Jostes, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis. **277**, L30, 22-D11 (1984)
- KNIGHT, F. K. Infrared Emission from Accretion Disks: Detectability and Variability. J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke. **284**, 745, 107-B9 (1984)
- The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- KNIGHT, R. D. The Radiative Lifetime of the 3S_0 Metastable Level of O^{++} . B. Carol Johnson, Peter L. Smith, and R. D. Knight. **281**, 477, 65-B6 (1984)
- KNOKE, J. E. Limits of Arcsecond-Scale Fluctuations in the Cosmic Microwave Background. J. E. Knoke, R. B. Partridge, M. I. Ratner, and I. I. Shapiro. **284**, 479, 104-D3 (1984)
- KOCH, ROBERT H. Einstein Observations of Selected Close Binaries and Shell Stars. Edward F. Guinan, Robert H. Koch, and Mirek J. Plavec. **282**, 667, 82-C11 (1984)
- KODAIRA, K. On the Metallicity of Blue Horizontal-Branch Stars in M4 and NGC 6397. K. Kodaira and A. G. Davis Philip. **278**, 201, 26-B12 (1984)
- High-Dispersion Spectroscopic Investigation of Field Horizontal-Branch, High-Luminosity, and Main-Sequence Stars. K. Kodaira and A. G. Davis Philip. **278**, 208, 26-C6 (1984)
- Digital Surface Photometry of Galaxies toward a Quantitative Classification. III. A Mean Concentration Index as a Parameter Representing the Luminosity Distribution. S. Okamura, K. Kodaira, and M. Watanabe. **280**, 7, 49-A13 (1984)
- KODAIRA, KEIICHI. Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi. **280**, 213, 51-D1 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130–200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira. **287**, 359, 136-G7 (1984)
- KOESTER, D. Temperatures and Surface Gravities of DB White Dwarfs. J. B. Oke, V. Weidemann, and D. Koester. **281**, 276, 64-A1 (1984)
- KOHYAMA, YASU HARU. Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama. **279**, 413, 41-D10 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections in the Liquid Metal Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **280**, 787, 58-D9 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **285**, 304, 113-C2 (1984)
- Electrical and Thermal Conductivities of Dense Matter in the Crystalline Lattice Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **285**, 758, 119-F12 (1984)
- KOLB, EDWARD W. Limits from the Soft X-Ray Background on the Temperature of Old Neutron Stars and on the Flux of Superheavy Magnetic Monopoles. Edward W. Kolb and Michael S. Turner. **286**, 702, 130-G2 (1984)
- KONDO, I. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo. **280**, 887, 59-D12 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H.

- Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- KONDO, Y. Variability of the Ultraviolet Spectrum of BL Lacertae Objects. M. H. Ulrich, K. R. H. Hackney, R. L. Hackney, and Y. Kondo. **276**, 466, 6-F2 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- KONDO, YOJI. Comments on the Ultraviolet Spectrum of γ^2 Velorum. Jorge Sahade, Yoji Kondo, and George E. McCluskey, Jr. **276**, 281, 3-G11 (1984)
- The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- KÖNIGL, ARIEH. Optically Thick Ablation Fronts. Arie König. **284**, 303, 101-C10 (1984)
- KOO, DAVID C. Angular Correlations of Galaxies to $B = 24$: Another Probe of Cosmology and Galaxy Evolution. David C. Koo and Alexander S. Szalay. **282**, 390, 79-C7 (1984)
- KOONIN, M. J. Associations between Coronal Mass Ejections and Metric Type II Bursts. N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koonin, and D. J. Michels. **279**, 839, 47-A4 (1984)
- KOONIN, S. E. Bound-State Decay of Rhenium-187. R. D. Williams, W. A. Fowler, and S. E. Koonin. **281**, 363, 64-G11 (1984)
- KORMENDY, JOHN. The Velocity Dispersion in the Disk of the S0 Galaxy NGC 1553. John Kormendy. **286**, 116, 123-B11 (1984)
- The Velocity Dispersion in the Disk of the SB0 Galaxy NGC 936. John Kormendy. **286**, 132, 123-D1 (1984)
- Recognizing Merger Remnants among Normal Elliptical Galaxies: NGC 5813. John Kormendy. **287**, 577, 140-D9 (1984)
- KOROSMEZEY, A. The Friable Sponge Model of a Cometary Nucleus. M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Korosmezey, K. Kecskemeti, A. F. Nagy, and K. Szego. **278**, 449, 28-G5 (1984)
- KORYCANSKY, D. G. The 3000 Å Bump in Quasars. J. B. Oke, G. A. Shields, and D. G. Korycansky. **277**, 64, 11-F1 (1984)
- KOUVELIOTOU, C. Analysis of Solar Flare Gamma-Ray Events. C. Kouveliotou, R. A. Treumann, and M. Scholer. **278**, 420, 28-E1 (1984)
- KOVETZ, ATTAY. The Effect of Diffusion on Prena Evolution: CNO-enriched Envelopes. Dina Prialnik and Attay Kovetz. **281**, 367, 65-A1 (1984)
- Diffusion in a Thermally Pulsating Star. Attay Kovetz, Dina Prialnik, and Giora Shaviv. **282**, 584, 81-D10 (1984)
- KOWALSKI, M. P. An X-Ray Survey of Clusters of Galaxies. IV. A Survey of Southern Clusters and a Compilation of Upper Limits for Both Abell and Southern Galaxies. M. P. Kowalski, M. P. Ulmer, R. G. Craddock, and K. S. Wood. **56**, 403, 29-A9 (1984) (Abstr. in **286**, 822, 132-A13)
- KOYAMA, K. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, 141, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- KOZLOVSKY, B. Nuclear Processes in the Jets of SS 433. R. Ramaty, B. Kozlovsky, and R. E. Lingenfelter. **283**, 113, 91-F1 (1984)
- KRAAN-KORTEWEG, R. G. The Effect of the Perturbation of the Local Velocity Field by Virgo on the Calculation of Differential Luminosity Functions. R. G. Kraan-Korteweg, Allan Sandage, and G. A. Tammann. **283**, 24, 86-C7 (1984)
- KRAIMAN, JAMES B. Photometric Study of NGC 2023 in the 3500 Å to 10000 Å Region: Confirmation of a Near-IR Emission Process in Reflection Nebulae. Adolf N. Witt, Rudolph E. Schild, and James B. Krimigis. **281**, 708, 70-C3 (1984)
- KRAUSHAAR, W. L. Limits on Soft X-Ray Flux from Distant Emission Regions. D. N. Burrows, D. McCammon, W. T. Sanders, and W. L. Kraushaar. **287**, 208, 135-B13 (1984)
- KRAUTTER, J. The Detection of X-Rays from Nova Muscae 1983 with the EXOSAT Satellite. H. Ogelman, K. Beuermann, and J. Krautter. **287**, 131, 138-E4 (1984)
- KRIMIGIS, S. M. Estimate of Cosmic-Ray Latitudinal Gradient in 1981-1982. R. B. Decker, S. M. Krimigis, and D. Venkatesan. **278**, 1119, 36-C7 (1984)
- KRISCIUNAS, KEVIN. Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. Becklin. **284**, 118, 99-D1 (1984)
- KRISS, GERARD A. Observational Tests of X-Ray Heating in the Broad-Line Region of Quasars and Seyfert Galaxies. Gerard A. Kriss. **277**, 495, 17-D13 (1984)
- KRISTIAN, JEROME. Stellar Populations in Local Group Dwarf Elliptical Galaxies. II. NGC 205. Jeremy Mould, Jerome Kristian, and G. S. Da Costa. **278**, 575, 32-B12 (1984)
- A Search for Young, Luminous Optical Pulsars in Extragalactic Supernova Remnants. John Middleditch and Jerome Kristian. **279**, 157, 38-F5 (1984)
- KROLIK, J. H. Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt. **280**, 499, 55-C11 (1984)
- The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. J. H. Krolik, A. Meiksin, and P. C. Joss. **282**, 466, 80-C4 (1984)
- KROLIK, JULIAN H. The Dynamics of the Narrow Line Regions of Seyfert Galaxies. Julian H. Krolik and J. M. Vrilek. **279**, 521, 43-E5 (1984)
- The Appearance, Number, and History of Highly Compact Binary Systems in Globular Clusters. Julian H. Krolik. **282**, 452, 80-B4 (1984)
- Soft X-Ray Opacity in Hot and Photoionized Gases. Julian H. Krolik and Timothy R. Kallman. **286**, 366, 125-G9 (1984)
- KRONBERG, P. P. The Rotation Measure Distribution of QSOs and of Intervening Clouds: Magnetic Fields and Column Densities. G. L. Welter, J. J. Perry, and P. P. Kronberg. **279**, 19, 37-B11 (1984)
- KRONBERG, PHILIPP P. Is There Really Evidence for Universal Rotation? Michael F. Bientenholz and Philipp P. Kronberg. **287**, 11, 138-C3 (1984)
- KRUMM, N. Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm. **287**, 586, 140-E5 (1984)
- KRUPER, JOHN. A Sharp X-Ray Absorption Feature in the BL Lacertae Object PKS 2155 - 304. Claude R. Canizares and John Kruper. **278**, 199, 36-B2 (1984)
- KRZEMINSKI, W. CPD - 48°1577: The Brightest Known Cataclysmic Variable. R. F. Garrison, R. E. Schild, W. A. Hiltner, and W. Krzeminski. **276**, 113, 5-E13 (1984)
- KU, W. H.-M. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- KU, WILLIAM H.-M. Einstein Observations of the Cygnus Loop. William H.-M. Ku, Steven M. Kahn, Ryszard Pisarski, and Knox S. Long. **278**, 615, 32-E13 (1984)
- KUHL, L. V. X-Ray Photometry and Spectroscopy of T Tauri Stars. F. M. Walter and L. V. Kuhl. **284**, 194, 100-B12 (1984)
- KUHL, LEONARD V. The Chromospheric Hypothesis for the T Tauri Phenomenon. Nuria Calvet, Gibor Basri, and Leonard V. Kuhl. **277**, 725, 20-A11 (1984)
- KUHN, J. R. A New Measurement of the Facular Contrast near the Solar Limb. K. G. Libbrecht and J. R. Kuhn. **277**, 889, 21-G1 (1984)
- Limits on a Stochastic Gravitational Wave Background from Observations of Terrestrial and Solar Oscillations. S. P. Boughn and J. R. Kuhn. **286**, 387, 127-C9 (1984)
- KÜHR, H. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth. **279**, 116, 38-C3 (1984)
- The Radio Morphology of the X-Ray Radio Sources near 0454 + 844

- and 1803 + 784. K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus. **280**, 542, 55-F13 (1984)
- KÖHR, HELMUT. The Compact Radio Source 2021 + 614: A Peculiar Narrow-Line Radio Galaxy. Norbert Bartel, Irwin J. Shapiro, John P. Huchra, and Helmut Kühr. **279**, 112, 38-B13 (1984)
- Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke. **284**, L5, 103-A6 (1984)
- Very High Resolution Observations of Compact Sources in the Direction of Supernova Remnants: G74.87 + 1.22. Barry J. Geldzahler, David B. Shaffer, and Helmut Kühr. **286**, 284, 125-A9 (1984)
- KUIPER, T. B. H. Methyl Acetylene as a Temperature Probe for Dense Interstellar Clouds. T. B. H. Kuiper, E. N. Rodriguez Kuiper, Dale F. Dickinson, B. E. Turner, and B. Zuckerman. **276**, 211, 3-B9 (1984)
- 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann. **283**, 106, 87-B13 (1984)
- A Search for 183 GHz Emission from Water in Late-Type Stars. T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodriguez Kuiper, and P. Zimmermann. **286**, 310, 125-C9 (1984)
- KUMAR, C. K. Observations of Narrow Diffuse Interstellar Bands toward Stars with Low Reddening. S. R. Federman, C. K. Kumar, and P. A. Vanden Bout. **282**, 485, 80-D9 (1984)
- KUNASZ, PAUL B. Transfer of Resonance Line Radiation in the Comoving Frame of an Expanding Cylinder. Paul B. Kunasz. **276**, 677, 9-A1 (1984)
- KUNDRUP, HENRY E. On the Stability of a New Relativistic Kinetic Equation. Henry E. Kundrup. **282**, 361, 79-A5 (1984)
- KUNDU, M. R. A Study of the Evolution of Energetic Electrons in a Solar Flare. Gordon D. Holman, M. R. Kundu, and B. R. Dennis. **276**, 761, 9-G1 (1984)
- Interpretation of Microwave Active Region Structures Using SMM Soft X-Ray Observations. K. T. Strong, C. E. Alissandrakis, and M. R. Kundu. **277**, 865, 21-E4 (1984)
- VLA Observations of Fine Structures in a Solar Active Region at 6 Centimeter Wavelength. D. McConnell and M. R. Kundu. **279**, 421, 41-E4 (1984)
- Three-dimensional Structures of Two Solar Active Regions from VLA Observations at 2, 6, and 20 Centimeter Wavelengths. R. K. Shevgaonkar and M. R. Kundu. **283**, 413, 90-D14 (1984)
- Coronal Extension of Flaring Region Magnetic Fields Inferred from High-Resolution Microwave and Type III Burst Observations. P. Lantos, M. Pick, and M. R. Kundu. **283**, L71, 97-D7 (1984)
- KUNIEDA, H. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- KUNTH, DANIEL. The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N -Log S . Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub. **283**, 495, 92-C1 (1984)
- KUPERUS, MAX. Black Hole Accretion Disks: Coronal Stabilization of the Lightman-Eardley Instability. James A. Ionson and Max Kuperus. **284**, 389, 102-B12 (1984)
- KURT, V. G. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt. **280**, 150, 50-E14 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. **286**, L5, 126-D7 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- KURTZ, MICHAEL J. The Shane-Wirtanen Counts. Margaret J. Geller, Valerie de Lapparent, and Michael J. Kurtz. **287**, L55, 145-C2 (1984)
- KURUCZ, R. L. A Study of Solar Photospheric Limb-Darkening Variations. L. D. Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce. **283**, 426, 90-F4 (1984)
- KUTNER, M. L. Interpretation of Absolute Line Intensities on the NRAO 11 Meter and Other Millimeter Wave Telescopes. M. L. Kutner, L. Mundy, and R. J. Howard. **283**, 890, 96-E11 (1984)
- KUZNETSOV, A. V. A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognose 7) Satellite Experiment. P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky. **285**, L67, 121-E10 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. **286**, L5, 126-D7 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- KWAN, JOHN. Photoionization Models and Diagnosis of Physical Properties of the Broad-Line Emission Gas in Quasars and Seyfert Nuclei. John Kwan. **283**, 70, 86-G5 (1984)
- KWITTER, KAREN B. Nitrogen and Helium Enrichment in Four Wolf-Rayet Ring Nebulae. Karen B. Kwitter. **287**, 840, 143-D9 (1984)
- KWOK, SUN. Radio Structure of the Proto-Planetary Nebula GL 618. Sun Kwok and R. C. Bignell. **276**, 544, 7-E1 (1984)
- The Radio Structure of HM Sagittae. Sun Kwok, R. C. Bignell, and C. R. Purton. **279**, 188, 39-A12 (1984)
- X-Ray Emission from Symbiotic Novae. Sun Kwok and D. A. Leahy. **283**, 675, 94-C11 (1984)
- LABONTE, BARRY. Is Stellar Differential Rotation Observable? Barry LaBonte. **276**, 335, 4-D9 (1984)
- LACHIEZE-REY, M. Stability of Gravitational Systems and Gravothermal Catastrophe in Astrophysics. J. F. Sygnet, G. Des Forêts, M. Lachieze-Rey, and R. Pellat. **276**, 737, 9-E5 (1984)
- LACY, CLAUD H. Absolute Dimensions and Masses of Eclipsing Binaries. IV. EE Pegasi Is a Triple Star. Claud H. Lacy and Daniel M. Popper. **281**, 268, 63-G2 (1984)
- LACY, J. H. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult. **276**, 533, 7-D4 (1984)
- LACY, J. L. A Measurement of the Absolute Flux of Cosmic-Ray Electrons. R. L. Golden, B. G. Mauger, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse. **287**, 622, 141-A6 (1984)
- LADA, C. J. The Formation of Massive Stars along the W5 Ionization Front. B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering. **279**, 291, 40-B12 (1984)
- LADA, CHARLES J. NGC 2024: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein. **280**, 154, 50-F5 (1984)
- A Search for High-Velocity Carbon Monosulfide Emission in Star-Forming Regions. Harley A. Thronson, Jr. and Charles J. Lada. **284**, 135, 99-E4 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper. **284**, 597, 105-E12 (1984)
- The Formation and Early Dynamical Evolution of Bound Stellar Systems. Charles J. Lada, Michael Margulis, and David Dearborn. **285**, 141, 111-D14 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum.

- 286, 302, 125-C1 (1984)
The Nature of the Embedded Population in the Rho Ophiuchi Dark Cloud: Mid-Infrared Observations. *Charles J. Lada and Bruce A. Wilking*. **287**, 610, 140-G8 (1984)
- LAKE, GEORGE. Mass-to-Light Ratios for Binary Pairs of Dwarf Irregular Galaxies. *George Lake and R. A. Schommer*. **279**, L19, 42-E5 (1984)
A Successful Survey of H I in Low-Luminosity Elliptical Galaxies. *George Lake and R. A. Schommer*. **280**, 107, 50-B12 (1984)
- LAKE, KAYLL. Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. *W. Y. Chau, Kayll Lake, and J. Stone*. **281**, 560, 68-F2 (1984)
The Redshift Structure of the Big Bang in Inhomogeneous Cosmological Models. I. Spherical Dust Solutions. *Charles Hellaby and Kayll Lake*. **282**, 1, 74-A6 (1984)
- LAKHINA, G. S. Heat Flux Instability in Cometary and Solar Plasma. *G. S. Lakhina and B. Buti*. **280**, 917, 59-G5 (1984)
- LAMB, D. Q. VV Puppis: The Soft X-Ray Machine. *Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White*. **279**, 785, 46-D3 (1984)
- LAMB, F. K. Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Magnetosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. *R. F. Elsner and F. K. Lamb*. **278**, 326, 27-E4 (1984)
New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pradhan, N. E. White, K. S. Wood, and D. J. Yentis*. **283**, L53, 97-C2 (1984)
- LAMB, GERALD M. High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. *John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio*. **279**, 685, 45-C12 (1984)
- LAMBERT, D. L. IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovak, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
The CN Radical in Diffuse Interstellar Clouds. *S. R. Federman, A. C. Danks, and D. L. Lambert*. **287**, 219, 135-C11 (1984)
- LAMBERT, DAVID L. Nitrogen Abundances in Disk and Halo Dwarfs. *Jocelyn Tomkin and David L. Lambert*. **279**, 220, 39-D8 (1984)
Oxygen Isotopes in the Atmospheres of Betelgeuse and Antares. *Michael J. Harris and David L. Lambert*. **281**, 739, 70-E9 (1984)
Lithium in Late-Type Giants. III. The Weak G Band Giants. *David L. Lambert and Scott R. Sawyer*. **283**, 192, 88-B6 (1984)
Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. *David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson*. **284**, 223, 100-D14 (1984)
Oxygen Isotopic Abundances in the Atmospheres of Seven Red Giant Stars. *Michael J. Harris and David L. Lambert*. **285**, 674, 118-G7 (1984)
- LAMONTAGNE, R. WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? *M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne*. **282**, 763, 83-D4 (1984)
- LAMONTAGNE, ROBERT. A Long-Period Orbit for the Binary Wolf-Rayet Star HD 193793, WC7 + O4-5. *Robert Lamontagne, Anthony F. J. Moffat, and Wilhelm Seggewiss*. **277**, 258, 13-F10 (1984)
- LANDMAN, DONALD A. Physical Conditions in the Cool Parts of Prominences. II. The Mg Triplet Lines. *Donald A. Landman*. **279**, 438, 41-F13 (1984)
Physical Conditions in the Cool Parts of Spicules. *Donald A. Landman*. **284**, 833, 108-B6 (1984)
- LANDOLT, A. U. Broad-Band Photometry of Extreme Helium Stars. *J. S. Drilling, A. U. Landolt, and D. Schönberner*. **279**, 748, 46-A7 (1984)
- LANDSMAN, W. B. Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. *W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky*. **285**, 801, 120-C1 (1984)
- LANE, M. C. Effective Temperatures and Surface Gravities of Metallic-Line A Stars. *M. C. Lane and John B. Lester*. **281**, 723, 70-D7 (1984)
- LANG, F. L. HEAO 1 High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). *B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primini, and W. H. G. Lewin*. **285**, 258, 112-F9 (1984)
The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson*. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- LANG, KENNETH R. Very Large Array Observations of Solar Active Regions. IV. Structure and Evolution of Radio Bursts from 20 Centimeter Loops. *Robert F. Willson and Kenneth R. Lang*. **279**, 427, 41-E10 (1984)
- LANGER, S. H. Theory of Astrophysical SiO Masers. *S. H. Langer and W. D. Watson*. **284**, 751, 107-C1 (1984)
- LANGER, STEPHEN A. Rapid Postglitch Spin-up of the Superfluid Core in Pulsars. *M. A. Alpar, Stephen A. Langer, and J. A. Sauls*. **282**, 533, 81-A1 (1984)
- LANGER, WILLIAM D. Carbon and Oxygen Isotope Fractionation in Dense Interstellar Clouds. *William D. Langer, T. E. Graedel, Margaret A. Frerking, and P. B. Armentrout*. **277**, 581, 18-D4 (1984)
Bipolar Outflows in Dark Clouds. *Paul F. Goldsmith, Ronald L. Snell, Mark Hemeon-Heyer, and William D. Langer*. **286**, 599, 129-F7 (1984)
- LANTOS, P. Coronal Extension of Flaring Region Magnetic Fields Inferred from High-Resolution Microwave and Type III Burst Observations. *P. Lantos, M. Pick, and M. R. Kundu*. **283**, L71, 97-D7 (1984)
- LA PADULA, C. Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. *A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda*. **279**, 515, 43-D13 (1984)
Hard X-Ray Variability of Three Active Galactic Nuclei. *P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda*. **284**, 54, 98-E3 (1984)
- LAPIEDRA, RAMON. Long-Term Post-Newtonian Effects in a Binary System. *Miquel Portilla and Ramon Lapidra*. **286**, 633, 130-B3 (1984)
- LAROS, J. G. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt*. **280**, 150, 50-E14 (1984)
3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. *J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz*. **286**, 681, 130-E9 (1984)
Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Il'vovskiy, and C. Motch*. **286**, L5, 126-D7 (1984)
Three Precise Gamma-Ray Burst Source Locations. *T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer*. **286**, L15, 126-F3 (1984)
- LATHAM, DAVID W. The Baade-Wesselink Method and the Distances to RR Lyrae Stars. I. The Field Star VY Serpentis. *Bruce W. Carney and David W. Latham*. **278**, 241, 26-E11 (1984)
The Blue Stragglers of M67. *Ruth C. Peterson, Bruce W. Carney, and David W. Latham*. **279**, 237, 39-E13 (1984)
Detection of Binaries with Projected Separations as Large as 0.1 Parsec. *David W. Latham, John Tonry, John N. Bahcall, Raymond M. Soneira, and Paul Schechter*. **281**, L41, 66-G10 (1984)
Seven Poor Clusters of Galaxies. *Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis*. **283**, 33, 86-D3 (1984)
- LATTIMER, JAMES M. On the Accuracy of the Single-Nucleus Approximation in the Equation of State of Hot, Dense Matter. *Adam Burrows and James M. Lattimer*. **285**, 294, 113-B6 (1984)
- LAUBERTS, A. Coordinated UV and Optical Observations of the AM Herculis Object EI405 - 451 in the High and Low States. *L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips*. **285**, 214, 112-C6 (1984)
- LAVERY, RUSSELL J. The X-Ray Luminosity Function of Abell Clusters at a Redshift of 0.25. *J. Patrick Henry and Russell J. Lavery*. **280**, 1, 49-A6 (1984)
- LAWRENCE, A. 1-20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward*. **280**, 514, 56-B5 (1984)
Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- LAWRENCE, C. R. 5 Gigahertz Structure and Optical Identifications of Weak Extragalactic Radio Sources. *C. R. Lawrence, C. L. Bennett, J. N. Hewitt, and B. F. Burke*. **278**, L95, 36-A12 (1984)
5 GHz Source Variability and the Gain of the NRAO 300 Foot

- Telescope. C. L. Bennett, C. R. Lawrence, and B. F. Burke. **54**, 211, 4-E5 (1984) (Abstr. in **276**, 798, 10-B10)
- LAWRENCE, J. K. Solar Luminosity Fluctuations and Active Region Photometry. G. A. Chapman, A. D. Herzog, J. K. Lawrence, and J. C. Shelton. **282**, L99, 85-E2 (1984)
- LAZAREFF, BERNARD. Photoionized Stellar Wind Bubbles in a Cloudy Medium. Christopher F. McKee, Dave Van Buren, and Bernard Lazareff. **278**, L115, 36-C3 (1984)
- LEACOCK, R. J. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- LEAHY, D. The Central X-Ray Source in SS 433. J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall. **277**, 286, 14-A13 (1984)
- LEAHY, D. A. X-Ray Emission from Symbiotic Novae. Sun Kwok and D. A. Leahy. **283**, 675, 94-C11 (1984)
- LEAN, J. L. The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston. **282**, 776, 83-E3 (1984)
- LEBOFSKY, M. Infrared Emission from Accretion Disks: Detectability and Variability. J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke. **284**, 745, 107-B9 (1984)
- LEBOFSKY, M. J. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Narrow-Band Infrared Photometry of the Peculiar White Dwarf LHS 1126. M. J. Lebofsky and James Liebert. **278**, L111, 36-B13 (1984)
- The Luminous Host Galaxy and Anomalous Brackett-Gamma Line of Markarian 231. Roc M. Cutri, G. H. Rieke, and M. J. Lebofsky. **287**, 566, 140-C12 (1984)
- LEBOVITZ, N. R. On the Fission Theory of Binary Stars. IV. Exact Solutions in Polynomial Spaces. N. R. Lebovitz. **284**, 364, 102-A1 (1984)
- LEBRUN, F. Nearby Molecular Clouds. I. Ophiuchus-Sagittarius, $b > 10^\circ$. F. Lebrun and Y.-L. Huang. **281**, 634, 69-D12 (1984)
- LECKRONE, DAVID S. The Resonance Lines of Hg II in IUE Spectra of Chemically Peculiar Stars. David S. Leckrone. **286**, 725, 131-A14 (1984)
- LEE, HYUNG MOK. Optical Properties of Interstellar Graphite and Silicate Grains. B. T. Draine and Hyung Mok Lee. **285**, 89, 111-A3 (1984)
- LEE, LONG C. Photodissociation Rates of Molecules by the Interstellar Radiation Field. Long C. Lee. **282**, 172, 75-G4 (1984)
- LEE, S.-O. LMC Blue Globular Clusters Containing Cepheids. I. NGC 1856. P. W. Hodge and S.-O. Lee. **276**, 509, 7-B7 (1984)
- LEE, T. J. Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin. **284**, 118, 99-D1 (1984)
- LEER, EGIL. Fast-Mode Magnetohydrodynamic Waves in Coronal Holes and the Solar Wind. Tor Flå, Shadia R. Habbal, Thomas E. Holzer, and Egil Leer. **280**, 382, 53-B4 (1984)
- LEIBACHER, J. W. Linear Models of Acoustic Waves in Sunspot Umbrae. J. B. Gurman and J. W. Leibacher. **283**, 859, 96-C8 (1984)
- LEIGHTON, R. B. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- LEINERT, CH. Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith. **287**, 801, 143-A10 (1984)
- LEISAWITZ, DAVID. Can the Ballistic Particle Model Explain the Hubble Sequence? David Leisawitz and Frank Bash. **285**, 25, 110-C2 (1984)
- LEITER, DARRYL. Optical Characteristics of Young Quasars as Sources of the Cosmic X-Ray Background. Elihu Boldt and Darryl Leiter. **276**, 427, 6-C2 (1984)
- LÉNA, P. The Sub-Arc Second Structure of IRC2 at 5 Microns. A. Chelli, C. Perrier, and P. Léna. **280**, 163, 50-F14 (1984)
- LENNON, D. J. The Nitrogen-deficient Cluster NGC 6231. F. P. Keenan, P. J. F. Brown, P. L. Dufton, and D. J. Lennon. **279**, L11, 42-D12 (1984)
- LEPP, S. Deuterium Fractionation Mechanisms in Interstellar Clouds. A. Dalgarno and S. Lepp. **287**, L47, 138-F5 (1984)
- LEPP, STEPHEN. Molecules in the Early Universe. Stephen Lepp and Michael Shull. **280**, 465, 55-A5 (1984)
- LESTER, D. F. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey. **276**, 551, 7-E9 (1984)
- LESTER, DANIEL F. Evidence for an Infrared Disk in the Core of the Extraordinary Planetary Nebula Abell 30. Harriet L. Dinerstein and Daniel F. Lester. **281**, 702, 70-B11 (1984)
- An Infrared Disk at the Center of the Bipolar Planetary Nebula NGC 6302. Daniel F. Lester and Harriet L. Dinerstein. **281**, L67, 73-B2 (1984)
- Far-Infrared Photometry of Compact Extragalactic Sources: OJ 287 and BL Lacertae. Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking. **287**, L9, 138-C10 (1984)
- LESTER, JOHN B. Effective Temperatures and Surface Gravities of Metallic-Line A Stars. M. C. Lane and John B. Lester. **281**, 723, 70-D7 (1984)
- LESTRADE, J. F. VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips. **278**, 220, 26-D4 (1984)
- LESTRADE, JEAN-FRANÇOIS. Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips. **279**, 184, 39-A8 (1984)
- Detection of a Sub-Milliarcsecond Radio Component in the RS CVn System 1099. Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston. **282**, L23, 78-B12 (1984)
- LETAW, JOHN R. On the Abundances of Ultraheavy Cosmic Rays. John R. Letaw, Rein Silberberg, and C. H. Tsao. **279**, 144, 38-E6 (1984)
- Propagation of Heavy Cosmic-Ray Nuclei. John R. Letaw, Rein Silberberg, and C. H. Tsao. **56**, 369, 27-F9 (1984) (Abstr. in **285**, 875, 121-A6)
- LEUNG, CHUN MING. Synthesis of Complex Molecules in Dense Interstellar Clouds via Gas-Phase Chemistry: A Pseudo Time-dependent Calculation. Chun Ming Leung, Eric Herbst, and Walter F. Huebner. **56**, 231, 25-D7 (1984) (Abstr. in **284**, 870, 108-E2)
- LEVAN, P. D. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- He I $\lambda 10830$ Emission in Seyfert Galaxies and QSOs. P. D. LeVan, R. C. Puetter, Harding E. Smith, and Richard J. Rudy. **284**, 23, 98-B14 (1984)
- LEVINE, A. M. HEAO 1 High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primini, and W. H. G. Lewin. **285**, 258, 112-F9 (1984)
- The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- LEVREAU, RUSSELL M. Interactions between Pre-Main-Sequence Objects and Molecular Clouds. II. PV Cephei. Russell M. Leveault. **277**, 634, 19-A6 (1984)
- Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. Jorge Cantó, Luis F. Rodríguez, Nuria Calbet, and Russell M. Leveault. **282**, 631, 82-A1 (1984)
- LEVY, E. H. Oscillating Dynamo Magnetic Field in the Presence of an External Nondynamo Field. The Influence of a Solar Primordial Field. D. W. Boyer and E. H. Levy. **277**, 848, 21-D1 (1984)
- LEWIN, W. H. G. X-Ray Observations of the Burst Source MXB 1728 - 34. E. M. Basinska, W. H. G. Lewin, M. Sztajno, L. R. Cominsky, and F. J. Marshall. **281**, 337, 64-E9 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observa-

- tions of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsumo, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs.* **283**, 774, 95-D3 (1984)
- HEAO 1 High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). *B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primini, and W. H. G. Lewin.* **285**, 258, 112-F9 (1984)
- The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson.* **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- LEWIN, WALTER H. G. Precursors to X-Ray Bursts: The Result of Expansion and Subsequent Contraction of the Neutron Star's Photosphere. *Walter H. G. Lewin, William D. Vacca, and Ewa M. Basinska.* **277**, L57, 22-F8 (1984)
- LEWIS, B. M. Face-on Galaxies. *B. M. Lewis.* **285**, 453, 116-D5 (1984)
- LEY-KOO, EUGENIO. The Direct Measurement of the $3^3P_0-3^3P_1$ Fine-Structure Interval and the g -Factor of Atomic Silicon by Laser Magnetic Resonance. *Massimo Inguscio, K. M. Evenson, Virgilio Beltrán-López, and Eugenio Ley-Koo.* **278**, L127, 36-D9 (1984)
- LIANG, E. P. Resonant Absorption, Hot Electrons, and Cosmic Gamma-Ray Bursts. *E. P. Liang.* **283**, L21, 91-F9 (1984)
- LIBBRECHT, K. G. A New Measurement of the Facular Contrast near the Solar Limb. *K. G. Libbrecht and J. R. Kuhn.* **277**, 889, 21-G1 (1984)
- LICHTENSTADT, I. Effect of Initial Thermal Structure on the Collapse and Explosion of Iron Stellar Cores. *I. Lichtenstadt and S. A. Bludman.* **276**, 746, 9-E14 (1984)
- LIDHOLM, S. Solar Limb Brightening at 820 Microns. *C. Lindsay, T. de Graauw, C. de Vries, and S. Lidholm.* **277**, 424, 15-D14 (1984)
- LIEBERT, JAMES. PG 1012 - 029: A High-Excitation Eclipsing Cataclysmic Variable. *William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green.* **276**, 233, 3-D5 (1984)
- 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. *J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccacaro.* **277**, 43, 11-D6 (1984)
- GD 323: A White Dwarf with a Stratified H/He Atmosphere? *James Liebert, F. Wesemael, E. M. Sion, and G. Wegner.* **277**, 692, 19-F3 (1984)
- Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. *Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman.* **278**, 255, 26-F11 (1984)
- Narrow-Band Infrared Photometry of the Peculiar White Dwarf LHS 1126. *M. J. Lebofsky and James Liebert.* **278**, L111, 36-B13 (1984)
- The Close Binary Central Star of the Planetary Nebula Abell 41: A Helium-rich Subdwarf Primary. *Richard F. Green, James Liebert, and F. Wesemael.* **280**, 177, 51-A1 (1984)
- New Spectrophotometry of the Extremely Cool Proper Motion Star LHS 2924. *James Liebert, Todd A. Boroson, and Mark S. Giampapa.* **282**, 758, 83-C13 (1984)
- Hot Subdwarfs in Detached Binary Systems and Thick-Disk Cataclysmic Variables from the Palomar-Green Survey. *Donald H. Ferguson, Richard F. Green, and James Liebert.* **287**, 320, 136-D10 (1984)
- LIEBERT, JAMES W. Two New Extremely Hot Pulsating White Dwarfs. *Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert.* **279**, 751, 46-A10 (1984)
- The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N -Log S . *Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub.* **283**, 495, 92-C1 (1984)
- LIEN, DAVID J. A Reanalysis of the Interstellar CH Abundance. *David J. Lien.* **284**, 578, 105-D5 (1984)
- The Detection of $F^1\Pi_u-X^1\Sigma^+$ System of Diatomic Carbon toward X Persei. *David J. Lien.* **287**, L95, 145-F4 (1984)
- LIEU, R. A Study of the Spectra and Pulse Profiles of Centaurus X-3 from Hakucho. *R. Lieu, D. Venkatesan, and K. Mitani.* **282**, 709, 82-F14 (1984)
- LIGHTMAN, A. P. Determination of the Mass of Globular Cluster X-Ray Sources. *J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman.* **282**, L13, 78-A13 (1984)
- LIGHTMAN, ALAN P. A Unified N-Body and Statistical Treatment of Stellar Dynamics. I. The Hybrid Code. *Stephen L. W. McMillan and Alan P. Lightman.* **283**, 801, 95-F3 (1984)
- A Unified N-Body and Statistical Treatment of Stellar Dynamics. II. Applications to Globular Cluster Cores. *Stephen L. W. McMillan and Alan P. Lightman.* **283**, 813, 95-G1 (1984)
- LILLER, WILLIAM. On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. *Roberto Buonanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaino, and William Liller.* **277**, 220, 13-C12 (1984)
- BVRI Main-Sequence Photometry of the Globular Cluster M4. *Gonzalo Alcaino and William Liller.* **56**, 19, 22-B5 (1984) (Abstr. in **283**, 905, 96-F12)
- LIN, D. N. C. On the Tidal Interaction between Protoplanets and the Primordial Solar Nebula. I. Linear Calculation of the Role of Angular Momentum Exchange. *John Papaloizou and D. N. C. Lin.* **285**, 818, 120-D4 (1984)
- The Evolution of the Inner Regions of Viscous Accretion Disks Surrounding Neutron Stars. *Ronald E. Taam and D. N. C. Lin.* **287**, 761, 142-E12 (1984)
- On the Overstability of Axisymmetric Oscillations in Thin Accretion Disks. *G. R. Blumenthal, L. T. Yang, and D. N. C. Lin.* **287**, 774, 142-F11 (1984)
- LIN, R. P. Solar Hard X-Ray Microflares. *R. P. Lin, R. A. Schwartz, S. R. Kane, R. M. Pelling, and K. C. Hurley.* **283**, 421, 90-E13 (1984)
- LINDBLOM, LEE. Limits on the Gravitational Redshift from Neutron Stars. *Lee Lindblom.* **278**, 364, 28-A1 (1984)
- LINDSAY, C. Solar Limb Brightening at 820 Microns. *C. Lindsay, T. de Graauw, C. de Vries, and S. Lidholm.* **277**, 424, 15-D14 (1984)
- LINDSEY, C. Observations of the Brightness Profile of the Sun in the 30-200 Micron Continuum. *C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley.* **281**, 862, 71-G11 (1984)
- Temporal Variations in the Solar Submillimeter Continuum. *C. Lindsey and C. Kaminski.* **282**, L103, 85-E5 (1984)
- LINFIELD, ROGER. 3C 111: A Luminous Radio Galaxy with a Highly Collimated Jet. *Roger Linfield and Rick Perley.* **279**, 60, 37-E14 (1984)
- LING, J. C. HEAO 3 Observations of the Crab Pulsar. *W. A. Mahoney, J. C. Ling, and A. S. Jacobson.* **278**, 784, 34-D12 (1984)
- HEAO 3 Discovery of ^{26}Al in the Interstellar Medium. *W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson.* **286**, 578, 129-D14 (1984)
- LING, JAMES C. Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the HEAO 3 Gamma-Ray Spectrometer. *Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson.* **281**, 566, 68-F8 (1984)
- LINGENFELTER, R. E. Nuclear Processes in the Jets of SS 433. *R. Ramaty, B. Kozlowsky, and R. E. Lingenfelter.* **283**, L13, 91-F1 (1984)
- LINKE, R. A. Identification of the SiCC Radical toward IRC + 10216: The First Molecular Ring in an Astronomical Source. *P. Thaddeus, S. E. Cummins, and R. A. Linke.* **283**, L45, 97-B8 (1984)
- LINNELL, ALBERT P. A Light Synthesis Program for Binary Stars. I. *Albert P. Linnell.* **54**, 17, 1-B3 (1984) (Abstr. in **275**, 926, 147-E13)
- LINSKY, J. L. Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. *F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana.* **281**, 815, 71-D5 (1984)
- High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. *A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres.* **283**, 731, 95-A1 (1984)
- The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. *S. A. Drake, A. Brown, and J. L. Linsky.* **284**, 774, 107-D10 (1984)
- Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. *W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky.* **285**, 801, 120-C1 (1984)
- LINSKY, JEFFREY L. Sigma Geminorum (K1 III + ?): Variability of the Ultraviolet Lines near Conjunction. *Thomas R. Ayres, Theodore Simon, and Jeffrey L. Linsky.* **279**, 197, 39-B8 (1984)
- LISSAUER, JACK J. The Epsilon Aurigae Secondary: A Binary Embedded within a Disk? *Jack J. Lissauer and Dana E. Backman.* **286**, L39, 132-D10 (1984)
- LITES, BRUCE W. Photoelectric Observations of Chromospheric Sunspot Oscillations. II. Propagation Characteristics. *Bruce W. Lites.* **277**, 874, 21-E13 (1984)
- LITTLE, STEPHEN J. The $^{12}\text{C}/^{13}\text{C}$ Ratio of the Carbon Star V460 Cygni Revisited. *Irene R. Little-Marenin and Stephen J. Little.* **283**, 188, 88-B2 (1984)
- LITTLE-MARENIN, IRENE R. The $^{12}\text{C}/^{13}\text{C}$ Ratio of the Carbon Star V460 Cygni Revisited. *Irene R. Little-Marenin and Stephen J. Little.* **283**, 188, 88-B2 (1984)
- LIVINGSTON, W. C. The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. *A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston.* **282**, 776, 83-E3 (1984)
- LIVIO, MARIO. Local Stability of Thick Accretion Disks. I. Basic Equations and Parallel Perturbations in the Negligible Viscosity Case. *Marek A. Abramowicz, Mario Livio, Tsvi Piran, and Paul J. Witte.* **279**, 367, 41-A6 (1984)

- Lo, K. Y. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Clausen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Clausen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Clausen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- LOCKMAN, FELIX J. The H I Halo in the Inner Galaxy. Felix J. Lockman. **283**, 90, 87-A11 (1984)
- A Survey of the Latitude Structure of Galactic H I on Small Angular Scales. T. M. Bania and Felix J. Lockman. **54**, 513, 8-F9 (1984) (Abstr. in **278**, 895, 35-E13)
- LOCKWOOD, J. A. Integral Radial Cosmic Ray Gradients in the Solar System from 1972 to 1982. J. A. Lockwood and W. R. Webber. **279**, 151, 38-E13 (1984)
- LOEWENSTEIN, R. F. NGC 2024: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein. **280**, 154, 50-F5 (1984)
- Far-Infrared Selected Star Formation Regions. D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran. **281**, 225, 63-D1 (1984)
- On the Nature of the Material Surrounding Vega. D. A. Harper, R. F. Loewenstein, and J. A. Davidson. **285**, 808, 120-C8 (1984)
- LOGAN, J. D. Effects of the Nonlocal Character of the Mean Intensity, Deviations from Radiative Equilibrium, and a Nongray Atmosphere on Oscillations in Stellar Envelopes. H. A. Hill and J. D. Logan. **285**, 386, 114-B5 (1984)
- LOH, E. Limits on Astrophysical ν , Flux at $E_\nu > 10^{19}$ eV. R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck. **281**, L9, 65-E10 (1984)
- LOH, E. C. Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. J. Boone, R. Cady, G. L. Cassidy, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech. **285**, 264, 112-G1 (1984)
- LONDON, RICHARD A. The Spectra of X-Ray Bursting Neutron Stars. Richard A. London, Ronald E. Taam, and W. Michael Howard. **287**, L27, 138-D14 (1984)
- LONG, KNOX S. Einstein Observations of the Cygnus Loop. William H.-M. Ku, Steven M. Kahn, Ryszard Pisarski, and Knox S. Long. **278**, 615, 32-E13 (1984)
- A Search for X-Ray Polarization in Cosmic X-Ray Sources. John P. Hughes, Knox S. Long, and Robert Novick. **280**, 255, 51-G2 (1984)
- A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. Y. Matsui, Knox S. Long, John R. Dickel, and Eric W. Greisen. **287**, 295, 136-B9 (1984)
- LONGAIR, M. An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **277**, 115, 12-B12 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- LONSDALE, CAROL J. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van der Bult. **276**, 533, 7-D4 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson. **283**, L1, 91-E3 (1984)
- Brackett-Alpha Line Profiles of Young Stellar Objects. S. E. Persson, T. R. Geballe, Peter J. McGregor, Suzan Edwards, and Carol J. Lonsdale. **286**, 289, 125-A14 (1984)
- Infrared Observations of Interacting/Merging Galaxies. Carol J. Lonsdale, S. E. Persson, and K. Matthews. **287**, 95, 134-A7 (1984)
- LORD, STEVEN D. CO Emission from IRAS Galaxies. Judith S. Young, Jeffrey Kenney, Steven D. Lord, and F. Peter Schloerb. **287**, L65, 145-C14 (1984)
- LOREN, ROBERT B. Formaldehyde in the Orion Molecular Flow: Evidence for a Gentle Acceleration. Abwyn Wootten, Robert B. Loren, and J. Bally. **277**, 189, 13-A9 (1984)
- The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO⁺ Flow in NGC 2071. Abwyn Wootten, Robert B. Loren, Aage Sandqvist, Per Friberg, and Ake Hjalmarson. **279**, 633, 44-F14 (1984)
- The Methyl Cyanide Hot and Warm Cores in Orion: Statistical Equilibrium Excitation Models of a Symmetric-Top Molecule. Robert B. Loren and Lee G. Mundy. **286**, 232, 124-D10 (1984)
- The Detection of Interstellar Methyl-Diacetylene. Robert B. Loren, Abwyn Wootten, and Lee G. Mundy. **286**, L23, 126-E11 (1984)
- High-Velocity HCO⁺ in Cepheus A: Ionization Levels in High-Density Clumps within a Molecular Flow. Robert B. Loren, Abwyn Wootten, Aa. Sandqvist, P. Friberg, and A. Hjalmarson. **287**, 707, 142-A11 (1984)
- LORRE, JEAN J. The Space Orientation of Stars. Laurance R. Doyle, Thomas J. Wilcox, and Jean J. Lorre. **287**, 307, 136-C10 (1984)
- LOSS, R. D. *p*-Process Nucleosynthesis and the Abundances of the Minor Isotopes of Tin. J. R. De Laeter, K. J. R. Rosman, and R. D. Loss. **279**, 814, 46-F4 (1984)
- LOUGHHEAD, R. E. High-Resolution Photography of the Solar Chromosphere. XIX. Flow Velocities along an Active Region Loop. R. E. Loughhead and R. J. Bray. **283**, 392, 90-C7 (1984)
- LOUGHNAN, L. Far-Infrared and CO Observations of the W33 Complex. M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughnan, S. Serio, and S. Sciortino. **283**, 573, 93-B4 (1984)
- LOVELACE, R. V. E. On the Kelvin-Helmholtz Instabilities of Supersonic Shear Layers. S. Roy Choudhury and R. V. E. Lovelace. **283**, 331, 89-E11 (1984)
- LOW, B. C. Three-dimensional Magnetostatic Atmospheres: Magnetic Field with Vertically Oriented Tension Force. B. C. Low. **277**, 415, 15-D5 (1984)
- Self-similar Magnetohydrodynamics. III. The Subset of Spherically Symmetric Gasdynamic Flows. B. C. Low. **281**, 381, 65-B1 (1984)
- Self-similar Magnetohydrodynamics. IV. The Physics of Coronal Transients. B. C. Low. **281**, 392, 65-B12 (1984)
- On the Large-Scale Magnetostatic Coronal Structures and Their Stability. B. C. Low. **286**, 772, 131-E5 (1984)
- LOW, F. J. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier. **278**, L75, 30-C9 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson. **283**, L1, 91-E3 (1984)

- LUB, JAN. The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N -Log S . *Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub*. **283**, 495, 92-C1 (1984)
- LUCK, R. EARLE. HD 46703: A High-Luminosity Population II F-Type Star. *R. Earle Luck and Howard E. Bond*. **279**, 729, 45-G2 (1984)
- LUCY, L. B. Wave Amplification in Line-driven Winds. *L. B. Lucy*. **284**, 351, 101-G2 (1984)
- LUGGER, P. M. Abundance of Interstellar Aluminum. *E. S. Barker, P. M. Lugger, E. J. Weiler, and D. G. York*. **280**, 600, 56-D5 (1984)
- LUGGER, PHYLLIS M. The Bright End of the Color-Magnitude Relation for Early-Type Galaxies in Clusters. *Phyllis M. Lugger*. **278**, 51, 24-E6 (1984)
- The Structure of First-Ranked Cluster Galaxies and the Radius-Magnitude Relation. *Phyllis M. Lugger*. **286**, 106, 123-A14 (1984)
- LUTZ, JULIE H. Ultraviolet and Optical Spectroscopy of Cn 1-1 (= HDE 330036). *Julie H. Lutz*. **279**, 714, 45-E13 (1984)
- LYNAS-GRAY, A. E. Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. *J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray*. **278**, 224, 26-D8 (1984)
- LYTLE, D. M. On the Rotation Rate of Polar Features in the Sun. *B. R. Durney, S. L. Keil, and D. M. Lytle*. **281**, 455, 65-G10 (1984)
- MACALPINE, GORDON M. Near-Infrared Spectrophotometry of Crab Nebula Filaments. *Richard B. C. Henry, Gordon M. MacAlpine, and Robert P. Kirshner*. **278**, 619, 32-F8 (1984)
- MACCACCARO, T. 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. *J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccacaro*. **277**, 43, 11-D6 (1984)
- X-Ray Variability of Quasars. *G. Zamorani, P. Giommi, T. Maccacaro, and H. Tananbaum*. **278**, 28, 24-C11 (1984)
- MACCACCARO, TOMMASO. X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. *Tommaso Maccacaro, Isabella M. Gioia, and John T. Stocke*. **283**, 486, 92-B6 (1984)
- The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N -Log S . *Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub*. **283**, 495, 92-C1 (1984)
- On the Surface Density of X-Ray Selected BL Lacertae Objects. *Tommaso Maccacaro, Isabella M. Gioia, Dario Maccagni, and John T. Stocke*. **284**, L23, 109-A6 (1984)
- MACCAGNI, DARIO. On the Surface Density of X-Ray Selected BL Lacertae Objects. *Tommaso Maccacaro, Isabella M. Gioia, Dario Maccagni, and John T. Stocke*. **284**, L23, 109-A6 (1984)
- MACCHETTO, F. [O III] Emission Surrounding the Quasar MR 2251-178. *S. di Serego Alighieri, M. A. C. Perryman, and F. Macchetto*. **285**, 567, 117-F10 (1984)
- MACDONALD, A. X-Ray Observations of Spiral Galaxies. I. Integrated Properties. *G. Fabbiano, G. Trinchieri, and A. Macdonald*. **284**, 65, 98-E14 (1984)
- MACDONALD, JIM. Are Cataclysmic Variables the Progenitors of Type I Supernovae? *Jim Macdonald*. **283**, 241, 88-E14 (1984)
- MACEK, JOSEPH H. Induced Atomic Orientation, An Efficient Mechanism for Magnetic Circular Polarization. *James C. Kemp, Joseph H. Macek, and Frederick W. Nehring*. **278**, 863, 35-C9 (1984)
- MACFARLANE, J. J. Statistical Mechanics of Light Elements at High Pressure. VI. Liquid-State Calculations with Thomas-Fermi-Dirac Theory. *J. J. MacFarlane*. **280**, 339, 52-E3 (1984)
- MACGILLIVRAY, HARVEY T. The NGC 5128 Globular Cluster System: A Complete Analysis of Images Using COSMOS. *Hugh C. Harris, Gretchen L. H. Harris, James E. Hesser, and Harvey T. MacGillivray*. **287**, 185, 135-A3 (1984)
- MACGREGOR, KEITH B. Winds from Rotating, Magnetic, Hot Stars. I. General Model Results. *David B. Friend and Keith B. MacGregor*. **282**, 591, 81-E3 (1984)
- MACKENY, JOHN W. Images and Spectra of the Host Galaxy of the QSO Markarian 1014. *John W. MacKenty and Alan Stockton*. **283**, 64, 86-F9 (1984)
- MACLEOD, J. M. The Detection of Interstellar Methylcyanoacetylene. *N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarsen*. **276**, L25, 5-F14 (1984)
- The Detection of Interstellar Methylidyneacetylene ($\text{CH}_2\text{C}_2\text{H}$). *J. M. MacLeod, L. W. Avery, and N. W. Broten*. **282**, L89, 85-D5 (1984)
- MACRAE, H. J. Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. *J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley*. **286**, L35, 132-D6 (1984)
- MADORE, B. F. JHK Observations of Classical Cepheids. *D. L. Welch, F. Wieland, C. W. McAlary, R. McGonegal, B. F. Madore, R. A. McLaren, and G. Neugebauer*. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- MADORE, BARRY F. The Distance to IC 1613 from Infrared Photometry of Cepheids. *Christopher W. McAlary, Barry F. Madore, and Lindsey E. Davis*. **276**, 487, 6-G10 (1984)
- On the Nonuniqueness of Self-propagating Spiral Galaxy Models. *Wendy L. Freedman and Barry F. Madore*. **280**, 592, 56-C9 (1984)
- The Distance to NGC 2403 Based on Near-Infrared Observations of Cepheids. *Christopher W. McAlary and Barry F. Madore*. **282**, 101, 75-A13 (1984)
- Galactic Detonation Waves: Numerical Models Illustrating the Transition from Deterministic to Stochastic. *Wendy L. Freedman, Barry F. Madore, and Sanju Mehta*. **282**, 412, 79-E5 (1984)
- Photographic Photometry of the Open Cluster NGC 7790. *Mario Pedreros, Barry F. Madore, and Wendy L. Freedman*. **286**, 563, 129-C13 (1984)
- MADSEN, JES. Firm Bounds on the Neutrino Mass from the Distribution of Dark Matter in Galaxies. *Jes Madsen and Richard I. Epstein*. **282**, 11, 74-B2 (1984)
- MAEJIMA, Y. Short-Term X-Ray Variability of GX 339-4. *Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi*. **285**, 712, 119-C7 (1984)
- MAGEE, N. H., JR. Is the Metal Contribution to the Astrophysical Opacity Incorrect? *N. H. Magee, Jr., A. L. Merts, and W. F. Huebner*. **283**, 264, 88-G10 (1984)
- Discrepancy in the CNO Opacity Bump Resolved. *T. R. Carson, W. F. Huebner, N. H. Magee, Jr., and A. L. Merts*. **283**, 466, 91-B7 (1984)
- MAGNANI, LORIS. High-Latitude Molecular Clouds. *Leo Blitz, Loris Magnani, and Lee Mundy*. **282**, L9, 78-A9 (1984)
- MAGNUSSON, CARL ERIK. Laboratory Identification of the $3s^2 3p^2 \ ^3P_{2,1} - 3s 3p^3 \ ^3S_2$ Intersystem Lines of S III. *Peter L. Smith, Carl Erik Magnusson, and Per Olof Zetterberg*. **277**, L79, 23-A5 (1984)
- MAHONEY, W. A. HEAO 3 Observations of the Crab Pulsar. *W. A. Mahoney, J. C. Ling, and A. S. Jacobson*. **278**, 784, 34-D12 (1984)
- HEAO 3 Discovery of ^{26}Al in the Interstellar Medium. *W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson*. **286**, 578, 129-D14 (1984)
- MAHONEY, WILLIAM A. Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the HEAO 3 Gamma-Ray Spectrometer. *Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson*. **281**, 566, 68-F8 (1984)
- MAKINO, F. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. *Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- MAKISHIMA, K. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. *Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **280**, 259, 51-G6 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. *S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo*. **280**, 887, 59-D12 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda,*

- Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara. **284**, 827, 108-A11 (1984)
- Short-Term X-Ray Variability of GX 339-4. Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi. **285**, 712, 119-C7 (1984)
- MALKAN, MATTHEW A. The Underlying Galaxies of X-Ray-Selected Quasars. Matthew A. Malkan, Bruce Margon, and Gary A. Chanan. **280**, 66, 49-F7 (1984)
- The Underlying Galaxies of Quasars. II. Imaging of a Radio-loud Sample. Matthew A. Malkan. **287**, 555, 140-C1 (1984)
- MALUMUTH, ELIOT M. The Evolution of Clusters of Galaxies. II. Tidal Stripping versus Mergers as a Function of Richness. Eliot M. Malumuth and Douglas O. Richstone. **276**, 413, 6-B2 (1984)
- MANAGAN, ROBERT A. On the Emission of Gravitational Radiation from Inhomogeneous Jacobi Configurations. James R. Ipser and Robert A. Managan. **282**, 287, 77-A8 (1984)
- MANCHANDA, R. K. Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda. **279**, 515, 43-D13 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda. **284**, 54, 98-E3 (1984)
- MANCHESTER, R. N. The Distribution of CO In the Galaxy for Longitudes 294° to 86° . B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon. **283**, L31, 97-A8 (1984)
- MARAN, STEPHEN P. Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes. **280**, 615, 56-E7 (1984)
- MARASCHI, L. Two-Temperature Model of Spherical Accretion onto a Black Hole. M. Colpi, L. Maraschi, and A. Treves. **280**, 319, 52-D11 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 - 451 in the High and Low States. L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips. **285**, 214, 112-C6 (1984)
- MARCAIDE, J. M. VLBI Study of 1038 + 528 A and B: Discovery of Wavelength Dependence of Peak Brightness Location. J. M. Marcaide and I. I. Shapiro. **276**, 56, 1-E5 (1984)
- The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth. **279**, 116, 38-C3 (1984)
- VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanromá, and A. Rius. **286**, 503, 128-E13 (1984)
- MARCHESONI, FABIO. Stochastic Models for the Evolution of Open Stellar Systems. Federico Ferrini and Fabio Marchesoni. **287**, 17, 133-B10 (1984)
- MARCONI, M. L. The Effects of the Diffuse Radiation Fields Due to Multiple Scattering and Thermal Radiation by Dust on the Dynamics and Thermodynamics of a Dusty Cometary Atmosphere. M. L. Marconi and D. A. Mendis. **287**, 445, 137-F11 (1984)
- MARCY, GEOFFREY W. Observations of Magnetic Fields on Solar-Type Stars. Geoffrey W. Marcy. **276**, 286, 4-A2 (1984)
- Magnetic Field Observations of Evolved Stars. Geoffrey W. Marcy and David H. Bruning. **281**, 286, 64-A12 (1984)
- MARDIROSSIAN, F. N-Body Simulations of Small Groups of Galaxies. G. Giuricin, F. Mardirossian, M. Mezzetti, and P. Santangelo. **277**, 38, 11-D1 (1984)
- The Period Distribution of Unevolved Close Binary Systems. G. Giuricin, F. Mardirossian, and M. Mezzetti. **54**, 421, 7-E5 (1984) (Abstr. in **277**, 908, 22-A9)
- MARGON, BRUCE. Spectrophotometry and Image Analysis of the Nebulosity around the Low-Redshift Quasar 0241 + 622. W. Romanishin, Holland Ford, Robin Ciardullo, and Bruce Margon. **277**, 487, 17-D5 (1984)
- The Underlying Galaxies of X-Ray-Selected Quasars. Matthew A. Malkan, Bruce Margon, and Gary A. Chanan. **280**, 66, 49-F7 (1984)
- Rapid Intensity Variability in the Jets of SS 433. Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes. **281**, 313, 64-C13 (1984)
- The Extragalactic Nature of H0323 + 022. Bruce Margon and George H. Jacoby. **286**, L31, 132-D2 (1984)
- MARGULIS, MICHAEL. The Formation and Early Dynamical Evolution of Bound Stellar Systems. Charles J. Lada, Michael Margulis, and David Dearborn. **285**, 141, 111-D14 (1984)
- MARISKA, J. T. The Energy Relation between Hard X-Ray and O V Emission in Solar Flares. A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer. **280**, 457, 53-G11 (1984)
- MARISKA, JOHN T. Effects of Mass Motions on Solar Emission Measures Inferred from Transition-Region Emission Lines. John T. Mariska. **281**, 435, 65-E14 (1984)
- MARKERT, THOMAS H. X-Ray Observations of M33 with the High Resolution Imager on the Einstein Observatory: Erratum. Thomas H. Markert and Andrew D. Rallis. **282**, 359, 77-F9 (1984) (Orig. paper in **275**, 571, 143-F14)
- MARLBOROUGH, J. M. Some Effects of Rotation on the Structure and Dynamics of a Radiation-driven Wind from a Hot Star. J. M. Marlborough and M. Zamir. **276**, 706, 9-C2 (1984)
- MAROTTA, ARUY. Collisional Excitation Rate Coefficients for Fe xi. Jie-Shan Wang, Aruy Marotta, and Raju U. Datta. **279**, 460, 42-A8 (1984)
- MARSCHER, ALAN P. Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the HEAO 3 Gamma-Ray Spectrometer. Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson. **281**, 566, 68-F8 (1984)
- MARSDEN, P. L. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- Far-Infrared Observations of the Crab Nebula. P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olmon. **278**, L29, 29-E3 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46-47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- MARSHALL, F. E. The Broad-Band X-Ray Spectrum of a QSO Sample. D. M. Worrall and F. E. Marshall. **276**, 434, 6-C10 (1984)
- The Central X-Ray Source in SS 433. J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall. **277**, 286, 14-A13 (1984)
- The Unusually Soft X-Ray Spectrum of LMC X-3. N. E. White and F. E. Marshall. **281**, 354, 64-G1 (1984)
- MARSHALL, F. J. X-Ray Observations of the Burst Source MXB 1728 - 34. E. M. Basinska, W. H. G. Lewin, M. Sztajno, L. R. Cominsky, and F. J. Marshall. **281**, 337, 64-E9 (1984)
- MARSHALL, FRANCIS E. Soft X-Ray Active Galactic Nuclei. Steven H. Pravdo and Francis E. Marshall. **281**, 570, 68-G12 (1984)
- An X-Ray Survey of Variable Radio Bright Quasars. Mark J. Henriksen, Francis E. Marshall, and Richard F. Mushotzky. **284**, 491, 104-E1 (1984)
- MARSHALL, FREDERIC J. SAS 3 Survey of the Soft X-Ray Background. Frederic J. Marshall and George W. Clark. **287**, 633, 141-B5 (1984)
- MARSHALL, H. L. A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccisi, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- MARTEN, A. The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager Iris Spectra: NH_3 , PH_3 , C_2H_2 , C_2H_6 , CH_3D , CH_4 , and the Saturnian D/H Isotopic Ratio. R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel. **287**, 899, 144-A14 (1984)
- MARTIN, BRIAN. Polarization Angle in Magnetic White Dwarfs. Brian Martin and D. T. Wickramasinghe. **283**, 782, 95-D11 (1984)
- MARTIN, P. G. Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. II. Implementation of the Method. P. G. Martin,

- C. Rogers, and G. B. Rybicki. **284**, 317, 101-D10 (1984)
- Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. III. Numerical Solution and Applications. C. Rogers and P. G. Martin. **284**, 327, 101-E6 (1984)
- MARTÍNEZ, R. E. Globular Cluster Swapping in Clusters of Galaxies. J. C. Muzzio, R. E. Martínez, and M. Rabolli. **285**, 7, 110-A12 (1984)
- MASAI, K. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- MASHOON, BAHAM. Toward Verification of Large-Scale Homogeneity in Cosmology. M. Hossein Partovi and Bahram Mashoon. **276**, 4, 1-A9 (1984)
- MASI, S. Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno. **278**, 150, 25-F2 (1984)
- Photon Mass and Cosmic Microwave Background Anisotropy. P. De Bernardis, S. Masi, F. Melchiorri, and A. Moletti. **284**, L21, 109-A4 (1984)
- MASON, G. M. Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. G. M. Mason, G. Gloeckler, and D. Hovestadt. **280**, 902, 59-E14 (1984)
- MASON, K. O. Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. F. A. Córdova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire. **278**, 739, 34-A9 (1984)
- Evidence for 4.4 Hour Periodic Dips in the X-Ray Flux from 4U 1755-33. N. E. White, A. N. Parmar, M. Sztajno, H. U. Zimmermann, K. O. Mason, and S. M. Kahn. **283**, L9, 91-E11 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Córdova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- MASSA, DERCK. Ultraviolet Observations of Interstellar Extinction near the Cepheus OB3 Molecular Cloud. Derck Massa and Blair D. Savage. **279**, 310, 40-D5 (1984)
- Main-Sequence B Stars with Strong Winds in the Core of NGC 6231. Derck Massa, Blair D. Savage, and Joseph P. Cassinelli. **287**, 814, 143-B9 (1984)
- MASSAGUER, JOSEPH M. Two-Dimensional Compressible Convection Extending over Multiple Scale Heights. Neal E. Hurlburt, Juri Toomre, and Joseph M. Massaguer. **282**, 557, 81-B11 (1984)
- MASSEY, PHILIP. Absolute Spectrophotometry of Wolf-Rayet Stars from 1200 to 7000 Å: A Cautionary Tale. Catharine D. Garmany, Philip Massey, and Peter S. Conti. **278**, 233, 26-E3 (1984)
- Absolute Spectrophotometry of Northern Wolf-Rayet Stars: How Similar Are the Colors? Philip Massey. **281**, 789, 71-B5 (1984)
- Spectroscopic Studies of Wolf-Rayet Stars with Absorption Lines. VIII. HD 193793. Peter S. Conti, Diane Roussel-Dupré, Philip Massey, and Michael Rensing. **282**, 693, 82-E11 (1984)
- MASSI, M. Star Formation in the M8E Region. M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders. **278**, 170, 25-G8 (1984)
- MASSON, C. R. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- On the Interpretation of the Broad-Band Millimeter-Wave Flux from Orion. E. C. Sutton, Geoffrey A. Blake, C. R. Masson, and T. G. Phillips. **283**, L41, 97-B4 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- ¹³CH₃OH in OMC-1. Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia. **286**, 586, 129-E8 (1984)
- MATEO, MARIO. An Unprecedented UV/Optical Flare in TV Columbae. Paula Szkody and Mario Mateo. **280**, 729, 57-F13 (1984)
- MATESE, JOHN J. Conservative Mass Transfer. II. The Effective Perturbing Force: Equations of Motion for the Eccentricity and Orbital Period. John J. Matese and Daniel P. Whitmire. **282**, 522, 80-G4 (1984)
- MATHER, J. C. Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^\circ$ to $l = +62^\circ$: Structure and Energetics of the Inner Disk. M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung. **285**, 74, 110-F14 (1984)
- MATHEWS, G. J. Neutron Capture Nucleosynthesis of Neodymium Isotopes and the s-Process from $A = 130$ to 150 . G. J. Mathews and F. Käppeler. **286**, 810, 132-A1 (1984)
- The ¹³N(p,γ)¹⁴O Thermonuclear Reaction Rate and the Hot CNO Cycle. G. J. Mathews and F. S. Dietrich. **287**, 969, 144-G1 (1984)
- MATHEZ, G. Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. G. Des Forêts, R. Dominguez-Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solé. **280**, 15, 49-B9 (1984)
- MATHIEU, ROBERT D. The Structure and Dynamics of the Open Cluster M11. Robert D. Mathieu. **284**, 643, 106-B2 (1984)
- MATSAKIS, D. N. Rapid Radio Variations in the Flux Density of BL Lacertae. K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Josties, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis. **277**, L30, 22-D11 (1984)
- MATSUI, Y. A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. Y. Matsui, Knox S. Long, John R. Dickel, and Eric W. Greisen. **287**, 295, 136-B9 (1984)
- MATSUMOTO, NORIYOSHI. Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama. **279**, 413, 41-D10 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections in the Liquid Metal Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **280**, 787, 58-D9 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **285**, 304, 113-C2 (1984)
- Electrical and Thermal Conductivities of Dense Matter in the Crystalline Lattice Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **285**, 758, 119-F12 (1984)
- MATSUOKA, M. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- Short-Term X-Ray Variability of GX 339-4. Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi. **285**, 712, 119-C7 (1984)
- MATTESON, J. L. The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- MATTHEWS, H. E. Shell Structure in Ultracompact H II Regions. B. E. Turner and H. E. Matthews. **277**, 164, 12-F9 (1984)
- MATTHEWS, K. Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W.

- H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 51-E14 (1984)
- Infrared Observations of Interacting/Merging Galaxies. Carol J. Lonsdale, S. E. Persson, and K. Matthews. **287**, 95, 134-A7 (1984)
- MATTHEWSON, D. S. Supernova Remnants in the Magellanic Clouds. D. S. Matthewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- MAUGER, B. G. A Measurement of the Absolute Flux of Cosmic-Ray Electrons. R. L. Golden, B. G. Mauger, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse. **287**, 622, 141-A6 (1984)
- MAXSON, C. W. Einstein Observations of X-Ray Emission from A Stars: Erratum. L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr. **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- Far-Infrared and CO Observations of the W33 Complex. M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino. **283**, 573, 93-B4 (1984)
- MAYOR, M. The Magnetic Fields of the Late-Type Stars. Ermanno F. Borra, Geoffrey Edward, and M. Mayor. **284**, 211, 100-D2 (1984)
- MAYR, HANS G. A Conjecture concerning Thermodynamic Limits to Solar Atmospheric Heating. Kenneth H. Schatten and Hans G. Mayr. **283**, 853, 96-C2 (1984)
- MAZURE, A. Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. G. Des Forêts, R. Dominguez-Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solé. **280**, 15, 49-B9 (1984)
- MALARY, C. W. JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. Malary, R. McGonegal, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- MALARY, CHRISTOPHER W. The Distance to IC 1613 from Infrared Photometry of Cepheids. Christopher W. Malary, Barry F. Madore, and Lindsey E. Davis. **276**, 487, 6-G10 (1984)
- The Distance to NGC 2403 Based on Near-Infrared Observations of Cepheids. Christopher W. Malary and Barry F. Madore. **282**, 101, 75-A13 (1984)
- Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. Helmut Kühr, Christopher W. Malary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke. **284**, L5, 103-A6 (1984)
- MALISTER, HAROLD A. Speckle Interferometric Measurements of Binary Stars. IX. Harold A. Malister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel. **54**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)
- MCBREEN, B. Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley. **279**, 162, 38-F11 (1984)
- Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. Irene Cruz-Gonzalez, B. McBreen, and G. G. Fazio. **279**, 679, 45-C6 (1984)
- Far-Infrared and CO Observations of the W33 Complex. M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino. **283**, 573, 93-B4 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen. **286**, 573, 129-D9 (1984)
- MCCABE, M. The Sun as a Star: 1982 June 14–August 13. R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime. **280**, 873, 59-C11 (1984)
- MCCABE, M. K. The Corona near the Time of the 1983 June 11 Total Solar Eclipse. D. G. Sime, R. R. Fisher, M. K. McCabe, and D. L. Mickey. **278**, L123, 36-C11 (1984)
- MCCAMMON, D. Limits on Diffuse X-Ray Emission from M101. D. McCammon and W. T. Sanders. **287**, 167, 134-F13 (1984)
- Limits on Soft X-Ray Flux from Distant Emission Regions. D. N. Burrows, D. McCammon, W. T. Sanders, and W. L. Kraushaar. **287**, 208, 135-B13 (1984)
- MCCARTHY, D. D. Rapid Radio Variations in the Flux Density of BL Lacertae. K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Jostes, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis. **277**, L30, 22-D11 (1984)
- MCCARTHY, JAMES K. A Spectroscopic Study of the Peculiar Giant FK Comae. I. The Radial Velocity Variation and Its Implications. James K. McCarthy and Lawrence W. Ramsey. **283**, 200, 88-B14 (1984)
- MCCINTOCK, J. E. Optical Identification of 2S 1417 – 62. J. E. Grindlay, L. D. Petro, and J. E. McClintock. **276**, 621, 8-C11 (1984)
- Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock. **280**, 688, 57-C14 (1984)
- Cygnus X-2: Neutron Star or Degenerate Dwarf? J. E. McClintock, L. D. Petro, G. Hammerslag-Hensberge, C. R. Proffitt, and R. A. Remillard. **283**, 794, 95-E9 (1984)
- MCCINTOCK, JEFFREY E. On the Detection of Positrons via the Optical Lines of Positronium. Jeffrey E. McClintock. **282**, 291, 77-A12 (1984)
- MCCLURE, ROBERT D. The Binary Nature of the CH Stars. Robert D. McClure. **280**, L31, 54-E7 (1984)
- MCCCLUSKEY, GEORGE E., JR. Comments on the Ultraviolet Spectrum of γ^2 Velorum. Jorge Sahade, Yoji Kondo, and George E. McCluskey, Jr. **276**, 281, 3-G11 (1984)
- MCCLYMONT, ALEXANDER N. Chromospheric Evaporation Velocities in Solar Flares. George H. Fisher, Richard C. Canfield, and Alexander N. McClymont. **281**, L79, 73-B13 (1984)
- MCCOMB, T. J. L. Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley. **286**, L35, 132-D6 (1984)
- MCCONNELL, D. VLA Observations of Fine Structures in a Solar Active Region at 6 Centimeter Wavelength. D. McConnell and M. R. Kundu. **279**, 421, 41-E4 (1984)
- MCCRAY, RICHARD. Spectral Variability in Early-Type Binary X-Ray Systems. Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson. **282**, 245, 76-E7 (1984)
- MCCUTCHEON, W. H. The Distribution of CO in the Galaxy for Longitudes 294° to 86° . B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon. **283**, L31, 97-A8 (1984)
- MCDAVID, DAVID. The Role of the Galactic Magnetic Field in the Evolution of a Dark Globular Filament in Cygnus. David McDavid. **284**, 141, 99-E10 (1984)
- MCDERMOTT, P. N. Electromagnetic Damping of Neutron Star Oscillations. P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen. **281**, 746, 70-F2 (1984)
- MCDOWELL, M. R. C. Electron Excitation Rate Coefficients for Transitions from the $1s^2\ ^1S$ Ground State to the $1s2s\ ^1S$ and $1s2p\ ^1P^o$ Excited States of Helium. K. M. Aggarwal, A. E. Kingston, and M. R. C. McDowell. **278**, 874, 35-D6 (1984)
- MCELROY, DOUGLAS B. The Initial Mass Function for Massive Stars in the Galaxy and the Magellanic Clouds. Roberta M. Humphreys and Douglas B. McElroy. **284**, 565, 105-C6 (1984)
- MCGLYNN, THOMAS A. Dissipationless Collapse of Galaxies and Initial Conditions. Thomas A. McGlynn. **281**, 13, 61-B4 (1984)
- MCGONEGAL, R. JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. Malary, R. McGonegal, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- MCGRAW, J. T. WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne. **282**, 763, 83-D4 (1984)
- MCGRAW, JOHN T. PG 1012 – 029: A High-Excitation Eclipsing Cataclysmic Variable. William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green. **276**, 233, 3-D5 (1984)
- MCGREGOR, P. J. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult. **276**, 533, 7-D4 (1984)
- A Photometric Comparison of Late-Type Cluster Supergiants in the Magellanic Clouds and the Galaxy. P. J. McGregor and A. R. Hyland. **277**, 149, 12-E7 (1984)
- Spectrophotometry of Compact Embedded Infrared Sources in the 0.6–1.0 Micron Wavelength Region. P. J. McGregor, S. E. Persson, and J. G. Cohen. **286**, 609, 129-G4 (1984)
- MCGREGOR, PETER J. Brackett-Alpha Line Profiles of Young Stellar Objects. S. E. Persson, T. R. Geballe, Peter J. McGregor, Suzan Edwards, and Carol J. Lonsdale. **286**, 289, 125-A14 (1984)
- McKEE, CHRISTOPHER F. Photoionized Stellar Wind Bubbles in a Cloudy Medium. Christopher F. McKee, Dave Van Buren, and Bernard Lazareff. **278**, L115, 36-C3 (1984)
- McKELLAR, A. R. W. Infrared and Far-Infrared Transition Frequencies for the CH₂ Radical. Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown. **276**, 399, 5-B7 (1984)
- McKENZIE, D. L. On the Rate of Energy Input in Thermal Solar Flares. U. Feldman, G. A. Doschek, and D. L. McKenzie. **276**, L53, 10-F10 (1984)
- McLAREN, R. A. JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. Malary, R. McGonegal, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)

- MCLEAN, A. D. Calculations Concerning the $\text{HCO}^+/\text{HOC}^+$ Abundance Ratio in Dense Interstellar Clouds. *D. J. DeFrees, A. D. McLean, and Eric Herbst*. **279**, 322, 40-E3 (1984)
- MCLEAN, B. J. Radio Observations of W Ursae Majoris Stars. *V. A. Hughes and B. J. McLean*. **278**, 716, 33-F10 (1984)
- MCMAHON, RICHARD. Nine New Quasi-stellar Objects with Broad Absorption Lines. *C. Hazard, Donald C. Morton, Roberto Terlevich, and Richard McMahon*. **282**, 33, 74-C10 (1984)
- MCMILLAN, ROBERT S. Magnetic Field Structure in the Taurus Dark Cloud. *Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry*. **282**, 508, 80-F4 (1984)
- MCMILLAN, STEPHEN L. W. A Unified N-Body and Statistical Treatment of Stellar Dynamics. I. The Hybrid Code. *Stephen L. W. McMillan and Alan P. Lightman*. **283**, 801, 95-F3 (1984)
- A Unified N-Body and Statistical Treatment of Stellar Dynamics. II. Applications to Globular Cluster Cores. *Stephen L. W. McMillan and Alan P. Lightman*. **283**, 813, 95-G1 (1984)
- MCNAMARA, BERNARD J. The Remarkable Multiple Mode δ Scuti Star BDS 1269A. *Bernard J. McNamara and Stephen J. Horan*. **282**, 741, 83-B9 (1984)
- Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. *Arthur N. Cox, Bernard J. McNamara, and William Ryan*. **284**, 250, 100-F13 (1984)
- MCNUTT, D. P. The HEAO A-1 X-Ray Source Catalog. *K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidaw*. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- MEEKINS, J. F. Millisecond Variability of Cygnus X-1. *J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman*. **278**, 288, 27-B6 (1984)
- The HEAO A-1 X-Ray Source Catalog. *K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidaw*. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- MEHTA, SANJU. Galactic Detonation Waves: Numerical Models Illustrating the Transition from Deterministic to Stochastic. *Wendy L. Freedman, Barry F. Madore, and Sanju Mehta*. **282**, 412, 79-E5 (1984)
- MEIDAV, M. The HEAO A-1 X-Ray Source Catalog. *K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidaw*. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- MEIER, DAVID L. A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. *Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Ruis*. **284**, 519, 104-G1 (1984)
- MEIKSIN, A. The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. *J. H. Krolik, A. Meiksin, and P. C. Joss*. **282**, 466, 80-C4 (1984)
- MEISENHEIMER, K. On the Rapid Optical Variability of PKS 0129 - 164. *K. Meisenheimer and H. J. Röser*. **279**, L39, 48-A7 (1984)
- MELCHIORRI, B. Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. *P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno*. **278**, 150, 25-F2 (1984)
- MELCHIORRI, F. Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. *P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno*. **278**, 150, 25-F2 (1984)
- Photon Mass and Cosmic Microwave Background Anisotropy. *P. de Bernardis, S. Masi, F. Melchiorri, and A. Moletti*. **284**, L21, 109-A4 (1984)
- MELIORANSKY, A. S. A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognoz 7) Satellite Experiment. *P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky*. **285**, L67, 121-E10 (1984)
- MELNICK, JORGE. The Clusters NGC 419 and NGC 416 in the Wing of the Small Magellanic Cloud. *Daniel Durand, Eduardo Hardy, and Jorge Melnick*. **283**, 552, 92-G7 (1984)
- Time Variations of the H α Line Profile from the Core of Eta Carinae. *Maria Teresa Ruiz, Jorge Melnick, and Patricio Ortiz*. **285**, L19, 114-G5 (1984)
- MELROSE, D. B. Radio-Frequency Heating of the Coronal Plasma during Flares. *D. B. Melrose and G. A. Dulk*. **282**, 308, 77-C1 (1984)
- MENDIS, D. A. The Effects of the Diffuse Radiation Fields Due to Multiple Scattering and Thermal Reradiation by Dust on the Dynamics and Thermodynamics of a Dusty Cometary Atmosphere. *M. L. Marconi and D. A. Mendis*. **287**, 445, 137-F11 (1984)
- MERCER-SMITH, J. A. On the Formation of Stars from Disk Accretion. *J. A. Mercer-Smith, A. G. W. Cameron, and R. I. Epstein*. **279**, 363, 41-A2 (1984)
- MEREDITH, R. J. The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley*. **285**, 202, 112-B8 (1984)
- MERRITT, DAVID. Relaxation and Tidal Stripping in Rich Clusters of Galaxies. II. Evolution of the Luminosity Distribution. *David Merritt*. **276**, 26, 1-C3 (1984)
- The Nature of Multiple-Nucleus Cluster Galaxies. *David Merritt*. **280**, L5, 54-C6 (1984)
- MERTS, A. L. Is the Metal Contribution to the Astrophysical Opacity Incorrect? *N. H. Magee, Jr., A. L. Merts, and W. F. Huebner*. **283**, 264, 88-G10 (1984)
- Discrepancy in the CNO Opacity Bump Resolved. *T. R. Carson, W. F. Huebner, N. H. Magee, Jr., and A. L. Merts*. **283**, 466, 91-B7 (1984)
- MÉSZÁROS, P. Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. *A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway*. **278**, 369, 28-A6 (1984)
- MEWALDT, R. A. A High-Resolution Study of the Isotopes of Solar Flare Nuclei. *R. A. Mewaldt, J. D. Spalding, and E. C. Stone*. **280**, 892, 59-E4 (1984)
- The Isotopic Composition of the Anomalous Low-Energy Cosmic Rays. *R. A. Mewaldt, J. D. Spalding, and E. C. Stone*. **283**, 450, 91-A3 (1984)
- MEYER, DAVID M. The Microwave Background Temperature at 2.64 and 1.32 Millimeters. *David M. Meyer and Michael Jura*. **276**, L1, 5-E2 (1984)
- Observations of Diffuse Interstellar Bands toward T Tauri Stars. *David M. Meyer and Roger K. Ulrich*. **283**, 98, 87-B5 (1984)
- MEYER, PETER. Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. *Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest*. **283**, 439, 90-G5 (1984)
- MEYERS, K. A. Are Forbidden Lines Present in the Optical Spectrum of the QSO 3C 273? *B. M. Peterson, K. A. Meyers, and E. R. Capriotti*. **283**, 529, 92-E12 (1984)
- MEYERS, KARIE A. Variability of the Emission-Line Spectra and Optical Continua of Seyfert Galaxies. II. *Bradley M. Peterson, Craig B. Foltz, D. Michael Crenshaw, Karie A. Meyers, and Paul L. Byard*. **279**, 529, 43-E13 (1984)
- MEZZETTI, M. N-Body Simulations of Small Groups of Galaxies. *G. Giuricin, F. Mardirossian, M. Mezzetti, and P. Santangelo*. **277**, 38, 11-D1 (1984)
- The Period Distribution of Unevolved Close Binary Systems. *G. Giuricin, F. Mardirossian, and M. Mezzetti*. **54**, 421, 7-E5 (1984) (Abstr. in **277**, 908, 22-A9)
- MICHAUD, G. Diffusion-induced Hydrogen Burning in Helium-rich White Dwarfs. *G. Michaud, G. Fontaine, and Y. Charland*. **280**, 247, 51-F8 (1984)
- The Lithium Abundance: Constraints on Stellar Evolution. *G. Michaud, G. Fontaine, and G. Beaudet*. **282**, 206, 76-B10 (1984)
- Diffusion-induced Hydrogen Burning and the Evolution of DA White Dwarfs. *G. Michaud and G. Fontaine*. **283**, 787, 95-E2 (1984)
- MICHEL, F. C. Relativistic Charge-separated Winds. *F. C. Michel*. **284**, 384, 102-B7 (1984)
- MICHEL, F. CURTIS. Hydraulic Jumps in "Viscous" Accretion Disks. *F. Curtis Michel*. **279**, 807, 46-E11 (1984)
- MICHEL, D. J. Associations between Coronal Mass Ejections and Metric Type II Bursts. *N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomeen, and D. J. Michels*. **279**, 839, 47-A4 (1984)
- MICHEL, H. H. Low-Temperature Dissociative Recombination of $e + \text{H}_2^+$. *H. H. Michels and R. H. Hobbs*. **286**, L27, 126-F1 (1984)
- MICKEY, D. The Sun as a Star: 1982 June 14–August 13. *R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime*. **280**, 873, 59-C11 (1984)
- MICKEY, D. L. The Corona near the Time of the 1983 June 11 Total Solar Eclipse. *D. G. Sime, R. R. Fisher, M. K. McCabe, and D. L. Mickey*. **278**, L123, 36-C11 (1984)
- MIDDLEDITCH, JOHN. A Search for Young, Luminous Optical Pulsars in Extragalactic Supernova Remnants. *John Middleditch and Jerome Kristian*. **279**, 157, 38-F5 (1984)
- MIGLIUOLO, STEFANO. Magnetohydrodynamic Stability of Line-tied Coronal Arcades. II. Shearless Magnetic Fields. *Stefano Migliuolo, Peter J. Cargill, and Alan W. Hood*. **281**, 413, 65-D5 (1984)
- MIHALAS, BARBARA WEIBEL. On the Propagation of Acoustic Waves in a Radiating Fluid: Addendum. *Dimitri Mihalas and Barbara Weibel Mihalas*. **283**, 469, 91-B10 (1984) (Orig. paper in **273**, 355, 116-B6)
- Self-consistent Radiation-hydrodynamic Equations for Stellar Oscillations. I. Nonlinear Form. *Barbara Weibel Mihalas*. **284**, 299, 101-C6 (1984)
- MIHALAS, DIMITRI. On the Propagation of Acoustic Waves in a Radiating Fluid: Addendum. *Dimitri Mihalas and Barbara Weibel Mihalas*. **283**, 469, 91-B10 (1984) (Orig. paper in **273**, 355, 116-B6)
- MIHALOV, J. D. Shock Acceleration of Nuclei and Electrons in the Heliosphere beyond 24 AU. *K. R. Pyle, J. A. Simpson, A. Barnes, and J. D. Mihalov*. **282**, L107, 85-E9 (1984)

- MIHALOV, JOHN D. The Far Reaches of the Solar Wind: *Pioneer 10* and *Pioneer 11* Plasma Results. Susan E. Kayser, Aaron Barnes, and John D. Mihalov. **285**, 339, 113-E13 (1984)
- MILEY, G. The *Infrared Astronomical Satellite* (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- Infrared Emission from M31. H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer. **278**, L59, 30-A1 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier. **278**, L75, 30-C9 (1984)
- A 25 Micron Component in 3C 390.3. G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young. **278**, L79, 30-C14 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- MILEY, G. K. The Kinematics of the Narrow-Line Region in Active Galaxies and Quasars. III. Correlations with the Broad-Line Region and Radio Emission. T. M. Heckman, G. K. Miley, and R. F. Green. **281**, 525, 68-C9 (1984)
- Emission-Line Gas Associated with the Radio Lobes of the High-Luminosity Radio Source 3C 171. T. M. Heckman, W. J. M. van Breugel, and G. K. Miley. **286**, 509, 128-F5 (1984)
- MILEY, GEORGE. Optical Line Emission Associated with the Radio Galaxy 4C 26.42 in the Cluster of Galaxies Abell 1795. Wil van Breugel, Timothy Heckman, and George Miley. **276**, 79, 1-F14 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley. **277**, 82, 11-G5 (1984)
- MILGROM, M. Nonadiabatic Self-consistent Spherical Accretion as a Model for Quasars and Active Galactic Nuclei. A. Wandel, A. Yahil, and M. Milgrom. **282**, 53, 74-E4 (1984)
- Isothermal Spheres in the Modified Dynamics. M. Milgrom. **287**, 571, 140-D3 (1984)
- MILGROM, MORDEHAI. Does the Missing Mass Problem Signal the Breakdown of Newtonian Gravity? Jacob Bekenstein and Mordehai Milgrom. **286**, 7, 122-A11 (1984)
- MILLER, H. R. Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- Multifrequency Spectral Behavior of the BL Lacertae Objects OI 90.4 and 3C 66A. D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinosa, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller. **286**, 711, 131-G11 (1984)
- MILLER, J. S. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). J. S. Miller, F. O. Clark, and T. H. Troland. **287**, 892, 144-A7 (1984)
- MILLER, L. An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **277**, 115, 12-B12 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- MILLER, RICHARD H. Gravitational Spurs and Resonances: Effects of Small Mass Disturbances in Spiral Galaxy Disks. Gene G. Byrd, Bruce F. Smith, and Richard H. Miller. **286**, 62, 122-E10 (1984)
- MILLET, J. Importance of Transverse Diffusion for Cosmic-Ray Propagation. P. Barge, J. Millet, and R. Pellat. **284**, 817, 108-A1 (1984)
- MILLIS, R. L. Temporal and Spatial Behavior of the Ultraviolet Emissions of Comet Iras-Araki-Alcock 1983d. P. D. Feldman, M. F. A'Hearn, and R. L. Millis. **282**, 799, 83-F14 (1984)
- MILLIS, ROBERT L. Comet 1983d: A Contrast between Data from IRAS and Data from the Ground. Michael F. A'Hearn and Robert L. Millis. **282**, L43, 78-D2 (1984)
- MILLS, ALLEN P., JR. Galaxy Mass Distribution from Gravitational Light Deflection. J. Anthony Tyson, Francisco Valdes, John F. Jarvis, and Allen P. Mills, Jr. **281**, L59, 73-A8 (1984)
- MILLS, B. Y. Supernova Remnants in the Magellanic Clouds. D. S. Mathewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- MILONE, E. F. Observations, Analysis, and Absolute Parameters of the Evolved Binary AI Phoenixis. B. J. Hrivnak and E. F. Milone. **282**, 748, 83-C3 (1984)
- A Radial Velocity Study of XY Leonis. B. J. Hrivnak, E. F. Milone, G. Hill, and W. A. Fisher. **285**, 683, 119-A4 (1984)
- A Study of the O'Connell Effect in the Light Curves of Eclipsing Binaries. T. J. Davidge and E. F. Milone. **55**, 571, 19-C1 (1984) (Abstr. in **282**, 820, 84-A10)
- Observations of the O'Connell Effect System VY Crucis. E. F. Milone and B. J. Hrivnak. **56**, 295, 27-A2 (1984) (Abstr. in **285**, 874, 121-A5)
- MIRABEL, I. F. Neutral Hydrogen in Seyfert Galaxies. I. F. Mirabel and A. S. Wilson. **277**, 92, 12-A3 (1984)
- Evidence for High-Velocity Inflow of Neutral Hydrogen toward the Galaxy. I. F. Mirabel and R. Morris. **279**, 86, 38-A2 (1984)
- MITAKE, SHINICHI. Electrical and Thermal Conductivities of Dense Matter in the Liquid Metal Phase. II. Low-Temperature Quantum Corrections. Shinichi Mitake, Setsuo Ichimaru, and Naoki Itoh. **277**, 375, 15-A4 (1984)
- MITANI, K. A Study of the Spectra and Pulse Profiles of Centaurus X-3 from Hakucho. R. Lieu, D. Venkatesan, and K. Mitani. **282**, 709, 82-F14 (1984)
- MITCHELL, GEORGE F. Effects of Shocks on the Sulfur Chemistry of a Dense Interstellar Cloud. George F. Mitchell. **287**, 665, 141-E6 (1984)
- Effects of Shocks on the Molecular Composition of a Dense Interstellar Cloud. George F. Mitchell. **54**, 81, 2-B12 (1984) (Abstr. in **275**, 928, 147-F1)
- MITCHELL, K. J. 4C 2947: Quasi-periodic Outbursts Recorded by Precessing Jets? J. J. Condon and K. J. Mitchell. **276**, 472, 6-F8 (1984)
- The Spectral Evolution of Low-Frequency Variable Radio Sources. Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon. **281**, L55, 73-A4 (1984)
- MITCHELL, KENNETH J. A Medium-Bright Quasar Sample: New Quasar Surface Densities in the Magnitude Range $16.4 < B < 17.65$. Kenneth J. Mitchell, Archibald Warnock III, and Peter D. Usher. **287**, L3, 138-C5 (1984)
- MITROFANOV, I. G. Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolidze. **286**, L11, 126-D14 (1984)
- MITSUODA, K. Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuoda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- MIJAJI, T. Detection of U45.379: An Intense, Peculiar Unidentified Line. H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito. **282**, 197, 76-B1 (1984)
- MİYAMA, SHOKEN M. Criteria for Collapse and Fragmentation of Rotating, Isothermal Clouds. Shoken M. Miyama, Chushiro Hayashi, and Shinji Narita. **279**, 621, 44-E11 (1984)
- MİYAMOTO, S. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I.

- Kondo, 280, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. 283, 774, 95-D3 (1984)
- MIZUMOTO, Y. Limits on Astrophysical ν Flux at $E_\nu > 10^{19}$ eV. R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck. 281, L9, 65-E10 (1984)
- MOCHNACKI, STEFAN W. Accurate Integrations of the Roche Model. Stefan W. Mochnacki. 55, 551, 19-A9 (1984) (Abstr. in 282, 820, 84-A10)
- MOFFAT, A. F. J. WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne. 282, 763, 83-D4 (1984)
- MOFFAT, ANTHONY F. J. A Long-Period Orbit for the Binary Wolf-Rayet Star HD 193793, WC7 + O4-5. Robert Lamontagne, Anthony F. J. Moffat, and Wilhelm Seggewiss. 277, 258, 13-F10 (1984)
- On the Nature of the Wolf-Rayet Component in the Core of the Massive Galactic H II Region NGC 3603. Anthony F. J. Moffat and Virpi S. Niemela. 284, 631, 106-A4 (1984)
- MOFFAT, J. W. The Orbital Motion of D1 Herculis as a Test of a Theory of Gravitation. J. W. Moffat. 287, L77, 145-E1 (1984)
- MOFFET, A. T. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. 282, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. 283, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. 285, L79, 121-G2 (1984)
- MOFFETT, THOMAS J. Observational Studies of Cepheids. II. BVRI Photometry of 112 Cepheids. Thomas J. Moffett and Thomas G. Barnes III. 55, 389, 16-B10 (1984) (Abstr. in 281, 890, 72-C3)
- MOK, Y. The Thermal Instability in a Sheared Magnetic Field: Filament Condensation with Anisotropic Heat Conduction. G. Van Hoven and Y. Mok. 282, 267, 76-G1 (1984)
- MOLETTI, A. Photon Mass and Cosmic Microwave Background Anisotropy. P. De Bernardis, S. Masi, F. Melchiorri, and A. Moletti. 284, L21, 109-A4 (1984)
- MONETI, ANDREA. Magnetic Field Structure in the Taurus Dark Cloud. Andrea Moneti, Judith L. Piper, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry. 282, 508, 80-F4 (1984)
- MOORE, RICHARD L. The Radio Morphology of Blazars and Relationships to Optical Polarization and to Normal Radio Galaxies. J. F. C. Wardle, Richard L. Moore, and J. R. P. Angel. 279, 93, 38-A9 (1984)
- A Comparison of the Properties of Highly Polarized QSOs versus Low-Polarization QSOs. Richard L. Moore and H. S. Stockman. 279, 465, 43-A5 (1984)
- The Optical Polarization Properties of "Normal" Quasars. H. S. Stockman, Richard L. Moore, and J. R. P. Angel. 279, 485, 43-B11 (1984)
- MOORE, RONALD. Heating the Sun's Lower Transition Region with Fine-Scale Electric Currents. Douglas Rabin and Ronald Moore. 285, 359, 113-G5 (1984)
- A Case for Submergence of Magnetic Flux in a Solar Active Region. Douglas Rabin, Ronald Moore, and M. J. Hagyard. 287, 404, 137-C12 (1984)
- MOORE, RONALD L. Magnetic Changes Observed in a Solar Flare. Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane. 276, 379, 5-A1 (1984)
- MOOS, H. W. IUE Observations of Longitudinal and Temporal Variations in the Jovian Auroral Emission. T. E. Skinner, S. T. Durrance, P. D. Feldman, and H. W. Moos. 278, 441, 28-F11 (1984)
- Electron Density-Dependent Intensity Ratios of Highly Ionized Iron Lines: A Comparison of Theory and Experiment. B. C. Stratton, H. W. Moos, and M. Finkenthal. 279, L31, 42-F3 (1984)
- Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky. 285, 801, 120-C1 (1984)
- MORAN, J. M. Far-Infrared Selected Star Formation Regions. D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran. 281, 225, 63-D1 (1984)
- MORBEY, CHRISTOPHER L. Does the Ellipticity of Clusters in the LMC Correlate with Age or Luminosity? Sidney van den Bergh and Christopher L. Morbey. 283, 598, 93-D11 (1984)
- MORENO, G. Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno. 278, 150, 25-F2 (1984)
- MORFILL, G. E. On the Nature of the Galactic Gamma-Ray Sources. G. E. Morfill, M. Forman, and G. Bignami. 284, 856, 108-D2 (1984)
- The Heating of Cloud-Hot Phase Interface Regions by the Dissipation of Hydromagnetic Waves. T. W. Hartquist and G. E. Morfill. 287, 194, 135-A13 (1984)
- Transport of Dust and Vapor and Chemical Fractionation in the Early Protosolar Cloud. G. E. Morfill and H. J. Volk. 287, 371, 137-A7 (1984)
- MORGAN, J. S. Narrow-Band Imaging and Velocity Maps of Young Stellar Objects: Initial Results. J. S. Morgan, S. C. Wolff, S. E. Strom, and K. M. Strom. 285, L71, 121-E14 (1984)
- MORIMOTO, M. Detection of U45.379: An Intense, Peculiar Unidentified Line. H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito. 282, 197, 76-B1 (1984)
- MORIMOTO, MASAKI. CS around Orion-KL: A Large Rotating Disk. Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane. 283, 117, 87-C10 (1984)
- MORITA, KOH-ICHIRO. CS around Orion-KL: A Large Rotating Disk. Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane. 283, 117, 87-C10 (1984)
- MORRAS, R. Evidence for High-Velocity Inflow of Neutral Hydrogen toward the Galaxy. I. F. Mirabel and R. Morras. 279, 86, 38-A2 (1984)
- MORRIS, MARK. The Three-dimensional Structure of a Circumstellar Maser. P. F. Bowers and Mark Morris. 276, 646, 8-E9 (1984)
- Bipolar Reflection Nebulae: Monte Carlo Simulations. F. Yusef-Zadeh, Mark Morris, and Richard L. White. 278, 186, 26-A11 (1984)
- CN and C₂H in IRC +10216. P. J. Huggins, A. E. Glassgold, and Mark Morris. 279, 284, 40-B5 (1984)
- MORRISON, PHILIP. Relativistic Jet Meets Target: The Gamma-Rays from 3C 273. Philip Morrison, Dana Roberts, and Alberto Sadun. 280, 483, 55-B9 (1984)
- MORTON, D. C. Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu. 276, 92, 2-A1 (1984)
- MORTON, DONALD C. The Absorption Line Profiles in Q1101-264. Robert F. Carswell, Donald C. Morton, Malcolm G. Smith, Alan N. Stockton, David A. Turnshek, and Ray J. Weymann. 278, 486, 36-C6 (1984)
- Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York. 281, 585, 69-A5 (1984)
- Nine New Quasi-stellar Objects with Broad Absorption Lines. C. Hazard, Donald C. Morton, Roberto Terlevich, and Richard McMahon. 282, 33, 74-C10 (1984)
- MOSELEY, H. Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. S. F. Odewald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley. 279, 162, 38-F11 (1984)
- MOSELEY, HARVEY. High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio. 279, 685, 45-C12 (1984)
- MOTCH, C. Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. 283, 774, 95-D3 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 - 451 in the High and Low States. L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips. 285, 214, 112-C6 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. 286, L5, 126-D7 (1984)
- MOUCHET, M. Coordinated UV and Optical Observations of the AM Herculis Object E1405 - 451 in the High and Low States. L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch,

- J. M. Bonnet Bidaud, and M. M. Phillips. **285**, 214, 112-C6 (1984)
- MOULD, J. R. Discovery of the First Carbon Star in NGC 6822. M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman. **277**, L9, 16-A9 (1984)
- The Intermediate Age SMC Globular Cluster Lindsay 113. J. R. Mould, G. S. Da Costa, and M. D. Crawford. **280**, 595, 56-C12 (1984)
- The Main-Sequence Turnoff of the Metal-rich Globular Cluster NGC 6171. G. S. Da Costa, J. R. Mould, and S. Ortolani. **282**, 125, 75-C9 (1984)
- Studies of Late-Type Dwarfs. VI. Identification of Population II Main-Sequence Stars at $M_v = +14$. F. D. A. Hartwick, A. P. Cowley, and J. R. Mould. **286**, 269, 124-G6 (1984)
- Main-Sequence Photometry of the SMC Globular Cluster Kron 3. R. M. Rich, G. S. Da Costa, and J. R. Mould. **286**, 517, 128-G1 (1984)
- MOULD, JEREMY. The Distances and Properties of a Sample of Sc I Galaxies. Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould. **278**, 475, 31-B9 (1984)
- Stellar Populations in Local Group Dwarf Elliptical Galaxies. II. NGC 205. Jeremy Mould, Jerome Kristian, and G. S. Da Costa. **278**, 575, 32-B12 (1984)
- A Probable Supernova Remnant in the Dwarf Elliptical Galaxy NGC 185. John S. Gallagher III, Deidre A. Hunter, and Jeremy Mould. **281**, L63, 73-A12 (1984)
- The Evolution of Asymptotic Giant Branch Stars in the Large Magellanic Cloud. Neill Reid and Jeremy Mould. **284**, 98, 99-A14 (1984)
- MOULD, JEREMY R. The Abundance of Lithium in the Old Galactic Cluster NGC 7789. Catherine A. Pilachowski, Jeremy R. Mould, and Michael J. Siegel. **282**, L17, 78-B7 (1984)
- MOUSCHOVIAS, TELEMACHOS CH. On "The Ambipolar Diffusion Time Scale and the Location of Star Formation in Magnetic Interstellar Clouds": Setting the Record Straight. Telemachos Ch. Mouschovias. **285**, 124, 111-C10 (1984)
- MUCHMORE, DAVID. Diffusion in White Dwarf Stars. David Muchmore. **278**, 769, 34-C11 (1984)
- MUFSON, S. L. Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- MULLAN, D. J. A Note on the Magnetic Field Strengths on the Surfaces of Cool Dwarfs. D. J. Mullan. **279**, 746, 46-A5 (1984)
- Alfvén Waves in the Solar Wind in Association with Solar Energetic Particles: Sunspot Umbra Origin? D. J. Mullan and A. J. Owens. **280**, 346, 52-E10 (1984)
- On the Possibility of Resonant Electrodynamical Coupling in the Coronae of Red Dwarfs. D. J. Mullan. **282**, 603, 81-F1 (1984)
- Carotating Interaction Regions in Stellar Winds. D. J. Mullan. **283**, 303, 89-C11 (1984)
- Asymmetries in Stellar Mg II h and k and Ca II H and K Line Profiles: Discrepancies Between Mg and Ca Asymmetries. D. J. Mullan. **284**, 769, 107-D5 (1984)
- MUMMA, M. J. Infrared Molecular Emissions from Comets. H. A. Weaver and M. J. Mumma. **276**, 782, 10-A8 (1984)
- Infrared Molecular Emissions from Comets: Erratum. H. A. Weaver and M. J. Mumma. **285**, 872, 121-A3 (1984) (Orig. paper in **276**, 782, 10-A8)
- MUNDT, REINHARD. Mass Loss in T Tauri Stars: Observational Studies of the Cool Parts of Their Stellar Winds and Expanding Shells. Reinhard Mundt. **280**, 749, 58-A9 (1984)
- Jets from Young Stars: The Case of R Monocerotis. Edvard R. Brugel, Reinhard Mundt, and Thomas Bürke. **287**, L73, 145-D10 (1984)
- MUNDY, L. Interpretation of Absolute Line Intensities on the NRAO 11 Meter and Other Millimeter Wave Telescopes. M. L. Kutner, L. Mundy, and R. J. Howard. **283**, 890, 96-E11 (1984)
- MUNDY, LEE. High-Latitude Molecular Clouds. Leo Blitz, Loris Magnani, and Lee Mundy. **282**, L9, 78-A9 (1984)
- MUNDY, LEE G. Models of Molecular Clouds. I. Multitransition Study of CS. Ronald L. Snell, Lee G. Mundy, Paul F. Goldsmith, Neal J. Evans II, and Neal R. Erickson. **276**, 625, 8-D2 (1984)
- The Methyl Cyanide Hot and Warm Cores in Orion: Statistical Equilibrium Excitation Models of a Symmetric-Top Molecule. Robert B. Loren and Lee G. Mundy. **286**, 232, 124-D10 (1984)
- The Detection of Interstellar Methyl-Diacetylene. Robert B. Loren, Abwyn Wootten, and Lee G. Mundy. **286**, L23, 126-E11 (1984)
- MUNRO, RICHARD H. Coronal Transient Geometry. I. The Flare-associated Event of 1981 March 25. Richard R. Fisher and Richard H. Munro. **280**, 428, 53-E10 (1984)
- MURAKAMI, T. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo. **280**, 887, 59-D12 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara. **284**, 827, 108-A11 (1984)
- MURRAY, M. J. Interstellar Magnesium Abundances. M. J. Murray, P. L. Dufton, A. Hibbert, and D. G. York. **282**, 481, 80-D5 (1984)
- MURRAY, S. S. Determination of the Mass of Globular Cluster X-Ray Sources. J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman. **282**, L13, 78-A13 (1984)
- MUSHOTZKY, R. The Line Continuum Luminosity Ratio in Active Galactic Nuclei: Or, On the "Baldwin Effect". R. Mushotzky and G. J. Ferland. **278**, 558, 32-A9 (1984)
- MUSHOTZKY, R. F. Temperature and Elemental Abundances in the Abell Cluster A576 Derived from X-Ray Observations. R. Rothenflug, L. Vigroux, R. F. Mushotzky, and S. S. Holt. **279**, 53, 37-E6 (1984)
- Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. W. A. Baily, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini. **279**, 555, 44-A1 (1984)
- Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt. **280**, 499, 55-C11 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)
- Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. G. J. Ferland and R. F. Mushotzky. **286**, 42, 122-D4 (1984)
- MUSHOTZKY, RICHARD F. An X-Ray Survey of Variable Radio Bright Quasars. Mark J. Henriksen, Francis E. Marshall, and Richard F. Mushotzky. **284**, 491, 104-E1 (1984)
- MUTEL, R. L. VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips. **278**, 220, 26-D4 (1984)
- MUTEL, ROBERT L. Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheidt, and Robert B. Phillips. **279**, 184, 39-A8 (1984)
- Detection of a Sub-Milliarsecond Radio Component in the RS CVn System 1099. Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston. **282**, L23, 78-B12 (1984)
- A Search for O^{18}H Maser Emission from G351.8 - 0.5. John D. Fix and Robert L. Mutel. **283**, 653, 94-A14 (1984)
- MUZZIO, J. C. Globular Cluster Swapping in Clusters of Galaxies. J. C. Muzzio, R. E. Martinez, and M. Rabolli. **285**, 7, 110-A12 (1984)
- MYERS, P. C. Dense Cores in Dark Clouds: Young Embedded Stars at 2 Micrometers. P. J. Benson, P. C. Myers, and E. L. Wright. **279**, L27, 42-E13 (1984)
- NAGAI, F. Gas Dynamics in the Impulsive Phase of Solar Flares. I. Thick-Target Heating by Nonthermal Electrons. F. Nagai and A. Gordon Emslie. **279**, 896, 47-E10 (1984)
- NAGAI, FUKUO. Transient Behavior of a Flare-associated Solar Wind. I. Gas Dynamics in a Radial Open Field Region. Fukuio Nagai. **277**, 379, 15-A8 (1984)
- Transient Behavior of Flare-associated Solar Wind. II. Gas Dynamics in a Nonradial Open Field Region. Fukuio Nagai. **278**, 841, 35-A13 (1984)
- NAGASE, F. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)

- Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- NAGY, A. F. The Friable Sponge Model of a Cometary Nucleus. M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Korosmezey, K. Kecskestey, A. F. Nagy, and K. Szego. **278**, 449, 28-G5 (1984)
- NAKATSUKA, R. The Energy Relation between Hard X-Ray and O V Emission in Solar Flares. A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer. **280**, 457, 53-G11 (1984)
- NARANAN, S. X-Ray Observations of X Persei. M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Naranan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland. **278**, 711, 33-F5 (1984)
- NARASIMHA, D. Convection in the Envelopes of Red Giants. H. M. Anita, S. M. Chitre, and D. Narasimha. **282**, 574, 81-C14 (1984)
- Gravitational Lens Models for the Triple Radio Source MG 2016 + 112. D. Narasimha, K. Subramanian, and S. M. Chitre. **283**, 512, 92-D9 (1984)
- NARITA, SHINJI. Criteria for Collapse and Fragmentation of Rotating, Isothermal Clouds. Shoken M. Miyama, Chushiro Hayashi, and Shinji Narita. **279**, 621, 44-E11 (1984)
- NASH, A. G. The Relative Abundances of Cyanogenated Molecules. E. Churchwell, A. G. Nash, and C. M. Walmsley. **287**, 681, 141-F9 (1984)
- NATHER, R. E. PG 1654 + 160: A New Pulsating DB White Dwarf. D. E. Winget, E. L. Robinson, R. E. Nather, and Suchitra Balachandran. **279**, L15, 42-E2 (1984)
- Time-resolved Spectroscopy of SS Cygni at Minimum and Maximum Light. F. V. Hessman, E. L. Robinson, R. E. Nather, and E.-H. Zhang. **286**, 747, 131-C8 (1984)
- NATTA, A. Ionized Magnesium in the Planetary Nebula NGC 7027. S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant. **277**, 207, 13-B13 (1984)
- Extinction in Inhomogeneous Clouds. A. Natta and N. Panagia. **287**, 228, 135-D6 (1984)
- NECKEL, THORSTEN. The Kinematics of the Crab Nebula's Jet. Peter Shull, Jr., Uri Carsty, Michael Sarcander, and Thorsten Neckel. **285**, L75, 121-F9 (1984)
- NEECE, GERALD D. Models of Lower-Main-Sequence Stars. Gerald D. Neece. **277**, 738, 20-B10 (1984)
- NEHRING, FREDERICK W. Induced Atomic Orientation, An Efficient Mechanism for Magnetic Circular Polarization. James C. Kemp, Joseph H. Macek, and Frederick W. Nehring. **278**, 863, 35-C9 (1984)
- NELSON, L. A. Extended Radio Observations of the SNR CTB 109. V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner. **283**, 147, 87-F1 (1984)
- NEMEC, JAMES. The Problem of the Barium Stars. Erika Böhm-Vitense, James Nemecek, and Charles Proffitt. **278**, 726, 33-G6 (1984)
- NEUGEBAUER, G. Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olin, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, H. J. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier. **278**, L75, 30-C9 (1984)
- A 25 Micron Component in 3C 390.3. G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young. **278**, L79, 30-C14 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson. **283**, L1, 91-E3 (1984)
- JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. McAlary, R. McGonagall, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- NEWELL, E. B. Distant Clusters of Galaxies. I. Uniform Photometry of Rich Clusters. Warrick J. Couch and E. B. Newell. **56**, 143, 23-E1 (1984) (Abstr. in **283**, 907, 96-F14)
- NEWSOM, G. H. On the Thermonuclear Origin of the Gamma-Rays from SS 433. R. N. Boyd, M. Wiescher, G. H. Newsom, and G. W. Collins II. **276**, L9, 5-E9 (1984)
- NEY, EDWARD P. The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr. **281**, 303, 64-C1 (1984)
- NG, Y. J. Spacetime Thermodynamics and the Inflationary Universe. T. W. Kephart, Y. J. Ng, and H. van Dam. **277**, 478, 17-C10 (1984)
- NGUYEN-Q-RIEU. Thermal and Maser Molecular Lines from the Envelope of IRC + 10216. Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner. **286**, 276, 125-A1 (1984)
- NICOLAS, K. R. HRTS II EUV Observations of a Solar Ephemeral Region. Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner. **278**, 428, 28-E9 (1984)
- NIEL, M. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt. **280**, 150, 50-E14 (1984)
- On the Morphology and Spectra of the Short Gamma-Ray Bursts. C. Barat, R. I. Hayles, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zenchenko. **285**, 791, 120-B3 (1984)
- A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognostic 7) Satellite Experiment. P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky. **285**, L67, 121-E10 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M.

- Zenchenko, A. V., Kuznetsov, V. G., Kurt, S., Ilvaskiy, and C. Motch. **286**, L5, 126-D7 (1984)
- Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolidze. **286**, L11, 126-D14 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- NIELL, ARTHUR E. Detection of a Sub-Millisecond Radio Component in the RS CVn System 1099. Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston. **282**, L23, 78-B12 (1984)
- NIEMELA, VIRPI S. On the Nature of the Wolf-Rayet Component in the Core of the Massive Galactic H II Region NGC 3603. Anthony F. J. Moffat and Virpi S. Niemela. **284**, 631, 106-A4 (1984)
- NIETO, JEAN-LUC. On the Structure of the Nucleus of M31. Jean-Luc Nieto. **287**, 108, 134-B6 (1984)
- NILES, D. W. Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall. **283**, 566, 93-A10 (1984)
- NISHI, KEIZO. Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi. **280**, 213, 51-D1 (1984)
- NITTA, N. Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo. **280**, 887, 59-D12 (1984)
- Hard X-Ray Imaging of a Solar Two-Ribbon Flare on 1981 August 21. T. Takakura, K. Ohki, N. Nitta, and J. L. Wang. **281**, L51, 67-A5 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara. **284**, 827, 108-A11 (1984)
- NITTA, NARIKI. Solar Flare Iron K α Emission Associated with a Hard X-Ray Burst. Katsuo Tanaka, Tetsuya Watanabe, and Nariaki Nitta. **282**, 793, 83-F8 (1984)
- NOAH, P. V. The FK Comae Candidate UZ Librae. Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley. **285**, 202, 112-B8 (1984)
- NOLAN, P. L. The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dohson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- NOLT, I. G. Millimeter-Wave Observations of Flat Spectrum Radio Sources. W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radostitz. **280**, 102, 50-B7 (1984)
- NOMOTO, K. Explosive Nucleosynthesis of Type I Supernovae. K. Nomoto, F.-K. Thielemann, and J. C. Wheeler. **279**, L23, 42-E9 (1984)
- Explosive Nucleosynthesis and Type I Supernovae: Erratum. K. Nomoto, F.-K. Thielemann, and J. C. Wheeler. **283**, L25, 91-F12 (1984) (Orig. paper in **279**, L23, 42-E9)
- NOMOTO, KEN'ICHI. Evolution of 8–10 M_{\odot} Stars toward Electron Capture Supernovae. I. Formation of Electron-Degenerate O + Ne + Mg Cores. Ken'ichi Nomoto. **277**, 791, 20-F11 (1984)
- Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi. **286**, 644, 130-B14 (1984)
- NOONAN, THOMAS W. On Test Particles in General Relativity. Thomas W. Noonan. **283**, 321, 89-E1 (1984)
- NORMAN, ERIC B. On the Half-Life of ^{180}Ta in Stellar Environments. Eric B. Norman, Stephen E. Kellogg, Timothy Bertram, Salvador Gil, and Peter Wong. **281**, 360, 64-G8 (1984)
- NORRIS, J. Discovery of the First Carbon Star in NGC 6822. M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman. **277**, L9, 16-A9 (1984)
- NORRIS, JOHN. The Anticorrelation of Cyanogen and CH on the Giant Branch of 47 Tucanae. John Norris, K. C. Freeman, and G. S. Da Costa. **277**, 615, 18-F10 (1984)
- The Ultra-Metal-deficient (Population III?) Red Giant CD – 38°245. M. S. Bessell and John Norris. **285**, 622, 118-C11 (1984)
- A Search for Cyanogen Variations on the Lower Giant Branch of M3. John Norris and Graeme H. Smith. **287**, 255, 135-F5 (1984)
- NOUSEK, J. A. E2003 + 225: A $3^{\text{h}}42^{\text{m}}$ AM Herculis Type Binary System. J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal. **277**, 682, 19-E7 (1984)
- NOUSEK, JOHN. XUV Observations of Capella and the Local Interstellar Medium. Norman Bobroff, John Nousek, and Gordon Garmire. **277**, 678, 19-E3 (1984)
- NOVAK, G. Detection of Submillimeter Polarization in the Orion Nebula. R. H. Hildebrand, M. Dragovan, and G. Novak. **284**, L51, 109-C7 (1984)
- NOVICK, R. Polarization Evidence for the Isotropy of Electrons Responsible for the Production of 5–20 keV X-Rays in Solar Flares. Leonard J. Tramiel, Gary A. Chanan, and R. Novick. **280**, 440, 53-F8 (1984)
- NOVICK, ROBERT. A Search for X-Ray Polarization in Cosmic X-Ray Sources. John P. Hughes, Knox S. Long, and Robert Novick. **280**, 255, 51-G2 (1984)
- NOYES, R. W. An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan. **276**, 254, 3-E12 (1984)
- Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan. **279**, 763, 46-B8 (1984)
- A Study of the Dependence of Mg II Emission on the Rotational Periods of Main-Sequence Stars. L. Hartmann, S. L. Baliunas, D. K. Duncan, and R. W. Noyes. **279**, 778, 46-C10 (1984)
- Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)
- NOYES, ROBERT W. The Relation between Stellar Rotation Rate and Activity Cycle Periods. Robert W. Noyes, Nigel O. Weiss, and Arthur H. Vaughan. **287**, 769, 142-F6 (1984)
- NOZAKURA, TOSHIYA. Formation of Dissipative Structures in Galaxies. Toshiya Nozakura and Satoru Ikeuchi. **279**, 40, 37-D5 (1984)
- Lateral Propagation of the Helium Shell Flash on an Accreting Neutron Star. Toshiya Nozakura, Satoru Ikeuchi, and Masayuki Y. Fujimoto. **286**, 221, 124-C13 (1984)
- NUGENT, JOHN J. X-Ray Emission from Supernova Remnants MSH 14-53 and RCW 103. John J. Nugent, Steven H. Pravdo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler. **284**, 612, 105-F13 (1984)
- NULSEN, P. E. J. The Mass Profile and Gas Content of M87. G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen. **278**, 536, 31-G1 (1984)
- NYE, ALAN H. Dynamical Phenomena in Sunspots. I. Observing Procedures and Oscillatory Phenomena. John H. Thomas, Lawrence E. Cram, and Alan H. Nye. **285**, 368, 114-A1 (1984)
- Dynamical Phenomena in Sunspots. II. A Moving Magnetic Feature. Alan H. Nye, John H. Thomas, and Lawrence E. Cram. **285**, 381, 114-A14 (1984)
- O'CONNELL, R. F. On the Magnetic Field in the White Dwarf Grw + 70°8247. Ronald J. W. Henry and R. F. O'Connell. **282**, L97, 85-D14 (1984)
- ODA, M. A Very Long X-Ray Burst with a Precursor from XB 1715 – 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo. **280**, 887, 59-D12 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 – 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara. **284**, 827, 108-A11 (1984)
- Short-Term X-Ray Variability of GX 339-4. Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi. **285**, 712, 119-C7 (1984)

- O'DEA, C. P. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H. M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan.* **276**, 454, 6-E2 (1984)
- What Bends 3C 4657? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen.* **278**, 37, 24-D6 (1984)
- O'DEA, CHRISTOPHER P. The 20 Year Spectral Evolution of the Radio Nucleus of NGC 1275. *Christopher P. O'Dea, William A. Dent, and Thomas J. Balonek.* **278**, 89, 25-A5 (1984)
- O'DELL, C. R. [O II] Studies of Galactic Planetary Nebulae and Extragalactic H II Complexes. *C. R. O'Dell and Hector O. Castañeda.* **283**, 158, 87-F14 (1984)
- O'DELL, S. L. The Spectral Evolution of Low-Frequency Variable Radio Sources. *Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon.* **281**, L55, 73-A4 (1984)
- ODENWALD, S. F. Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. *S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley.* **279**, 162, 38-F11 (1984)
- ODENWALD, STEN F. A Far-Infrared Survey of the Galactic Center. *Sten F. Odenwald and Giovanni G. Fazio.* **283**, 601, 93-D14 (1984)
- OEGERLE, WILLIAM R. Circumstellar Material around Rapidly Rotating B Stars. II. On the Nature of Ultraviolet Shell Lines in the Spectra of Be and Shell Stars. *William R. Oegerle and Ronald S. Polidan.* **285**, 648, 118-E9 (1984)
- OEMLER, AUGUSTUS, JR. The Evolution of Galaxies in Clusters. V. A Study of Populations since $z \sim 0.5$. *Harvey Butcher and Augustus Oemler, Jr.* **285**, 426, 116-B6 (1984)
- OGAWA, H. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L73, 85-C6 (1984)
- OGAWARA, Y. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. *Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo.* **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo.* **280**, 259, 51-G6 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. *S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo.* **280**, 887, 59-D12 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs.* **283**, 774, 95-D3 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. *S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara.* **284**, 827, 108-A11 (1984)
- Short-Term X-Ray Variability of GX 339-4. *Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi.* **285**, 712, 119-C7 (1984)
- OGELMAN, H. The Detection of X-Rays from Nova Muscae 1983 with the EXOSAT Satellite. *H. Ogelman, K. Beuermann, and J. Krautter.* **287**, L31, 138-E4 (1984)
- OHASHI, T. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. *Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo.* **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo.* **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs.* **283**, 774, 95-D3 (1984)
- OHISHI, M. Detection of U45379: An Intense, Peculiar Unidentified Line. *H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito.* **282**, 197, 76-B1 (1984)
- OHKI, K. Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. *S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo.* **280**, 887, 59-D12 (1984)
- Hard X-Ray Imaging of a Solar Two-Ribbon Flare on 1981 August 21. *T. Takakura, K. Ohki, N. Nitta, and J. L. Wang.* **281**, L51, 67-A5 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. *S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara.* **284**, 827, 108-A11 (1984)
- OKAMURA, S. Digital Surface Photometry of Galaxies toward a Quantitative Classification. III. A Mean Concentration Index as a Parameter Representing the Luminosity Distribution. *S. Okamura, K. K'daira, and M. Watanabe.* **280**, 7, 49-A13 (1984)
- OKE, J. B. The 3000 Å Bump in Quasars. *J. B. Oke, G. A. Shields, and D. G. Korycansky.* **277**, 64, 11-F1 (1984)
- Temperatures and Surface Gravities of DB White Dwarfs. *J. B. Oke, V. Weidemann, and D. Koester.* **281**, 276, 64-A1 (1984)
- Spectroscopy of the Nebulosity around Eight High-Luminosity QSOs. *Todd A. Boroson and J. B. Oke.* **281**, 535, 68-D5 (1984)
- Spectroscopy and Spectrophotometry of Distant Halo RR Lyrae Stars. *A. Saha and J. B. Oke.* **285**, 688, 119-A9 (1984)
- OLIVE, K. A. Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. *J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive.* **281**, 493, 68-A5 (1984)
- OLN, F. M. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young.* **278**, L1, 29-C3 (1984)
- Far-Infrared Observations of the Crab Nebula. *P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olmon.* **278**, L29, 29-E3 (1984)
- IRAS Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius.* **278**, L33, 29-E7 (1984)
- IRAS Observations of Two Early-Type Pre-Main-Sequence Stars in the Association Chamaeleon I. *P. R. Wesselius, D. A. Beintema, and F. M. Olmon.* **278**, L37, 29-E10 (1984)
- IRAS Observations of OH/IR Stars. *F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch.* **278**, L41, 29-E13 (1984)
- OLOFSSON, H. Thermal and Maser Molecular Lines from the Envelope of IRC +10216. *Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner.* **286**, 276, 125-A1 (1984)
- OLSON, D. W. A Comparison of Distance Scales for Early-Type Galaxies. *G. de Vaucouleurs and D. W. Olson.* **56**, 91, 22-G10 (1984) (Abstr. in **283**, 907, 96-F14)
- OLSON, GORDON L. Spectral Variability in Early-Type Binary X-Ray Systems. *Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson.* **282**, 245, 76-E7 (1984)
- OLSZEWSKI, EDWARD W. AM-1: A Very Distant Globular Cluster. *Marc Aaronson, Robert A. Schommer, and Edward W. Olszewski.* **276**, 221, 3-C5 (1984)
- Color-Magnitude Photometry for the Globular Cluster NGC 288. *Edward W. Olszewski, R. Canterna, and William E. Harris.* **281**, 158, 62-E13 (1984)
- Color-Magnitude Diagram Photometry of the LMC Red Cluster NGC 1978. *Edward W. Olszewski.* **284**, 108, 99-B11 (1984)
- A Distance to the Large Magellanic Cloud by Main-Sequence Fitting. *Robert A. Schommer, Edward W. Olszewski, and Marc Aaronson.* **285**, L53, 121-D11 (1984)
- OMODAKA, T. High Spatial Resolution Observations of Orion Bright Bar:

- CS ($J = 1-0$) and H51 α Emission. *T. Omodaka, M. Hayashi, and T. Hasegawa.* **282**, L77, 85-C9 (1984)
- ONAKA, TAKASHI. Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). *Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi.* **280**, 213, 51-D1 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130–200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. *Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira.* **287**, 359, 136-G7 (1984)
- Infrared Spectrum of the Laboratory-Synthesized Quenched Carbonaceous Composite (QCC): Comparison with the Infrared Unidentified Emission Bands. *Akira Sakata, Setsuko Wada, Toshihiko Tanabe, and Takashi Onaka.* **287**, L51, 138-F9 (1984)
- OOSTERLOO, T. A. Gravitational Imaging by Superclusters. *R. H. Sanders, T. S. van Albada, and T. A. Oosterloo.* **278**, L91, 36-A8 (1984)
- OPAL, CHET B. Observations of the Stellar Radiation Field at 975 Å. *Chet B. Opal and Charles S. Weller.* **282**, 445, 80-A10 (1984)
- OPHER, R. Detection of Massive Cosmic Neutrinos by Second-Order in G Coherent Scattering. *R. Opher.* **282**, 398, 79-D2 (1984)
- ORAN, ELAINE S. Detailed Studies of the Dynamics and Energetics of Coronal Bullets. *Judith T. Karpen, Elaine S. Oran, and Jay P. Boris.* **287**, 396, 137-C4 (1984)
- ORFORD, K. J. Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. *J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walsley.* **286**, L35, 132-D6 (1984)
- ORRALL, F. Q. Observations of the Brightness Profile of the Sun in the 30–200 Micron Continuum. *C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley.* **281**, 862, 71-G11 (1984)
- ORSATTI, ANA M. A Deep Photometric Study of IC 5146. *Juan C. Forte and Ana M. Orsatti.* **56**, 211, 25-B13 (1984) (Abstr. in **284**, 869, 108-E1)
- ORTIZ, PATRICIO. Time Variations of the H α Line Profile from the Core of Eta Carinae. *Maria Teresa Ruiz, Jorge Melnick, and Patricio Ortiz.* **285**, L19, 114-G5 (1984)
- ORTOLANI, S. The Main-Sequence Turnoff of the Metal-rich Globular Cluster NGC 6171. *G. S. Da Costa, J. R. Mould, and S. Ortolani.* **282**, 125, 75-C9 (1984)
- ORWIG, L. E. The High-Energy X-Ray Spectrum of Centaurus XR-3 Observed from OSO 8. *J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig.* **278**, 266, 26-G8 (1984)
- Correlated Observations of Impulsive UV and Hard X-Ray Bursts in Solar Flares from the Solar Maximum Mission. *Chung-Chieh Cheng, Einar Tandberg-Hanssen, and L. E. Orwig.* **278**, 853, 35-B11 (1984)
- The Energy Relation between Hard X-Ray and O V Emission in Solar Flares. *A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer.* **280**, 457, 53-G11 (1984)
- Fast Variations in High-Energy X-Rays from Solar Flares and Their Constraints on Nonthermal Models. *Alan L. Kiplinger, B. R. Dennis, K. J. Frost, and L. E. Orwig.* **287**, L105, 145-F13 (1984)
- OSHEROVICH, VLADIMIR A. Theoretical Model of the Solar Corona during Sunspot Minimum. I. Quasi-static Approximation. *Vladimir A. Osherovich, Israel Tzur, and Erast B. Gliner.* **284**, 412, 102-D7 (1984)
- OSTERBROCK, D. E. An Analysis of the Narrow-Line Profiles in High Ionization Seyfert Galaxies. *M. M. De Robertis and D. E. Osterbrock.* **286**, 171, 123-G5 (1984)
- OSTERBROCK, DONALD E. The Spectrum of V348 Sagittarii. *Oved Dahari and Donald E. Osterbrock.* **277**, 648, 14-B7 (1984)
- The Luminosity Function of Seyfert Galaxies and the Cluster 3C 295. *Donald E. Osterbrock.* **280**, L43, 60-D7 (1984)
- OSTRIKER, J. P. Are Cosmologically Distant Objects Obscured by Dust? A Test Using Quasars. *J. P. Ostriker and J. Heisler.* **278**, 1, 24-A6 (1984)
- OSTRIKER, JEREMIAH P. The Statistics of Gravitational Lenses: The Distributions of Image Angular Separations and Lens Redshifts. *Edwin L. Turner, Jeremiah P. Ostriker, and Richard J. Gott III.* **284**, 1, 98-A6 (1984)
- OWEN, F. N. High-Resolution Observations of the Steep Spectrum Source 2147 + 145. *W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Bååth, and J. Romney.* **277**, L41, 22-E6 (1984)
- What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen.* **278**, 37, 24-D6 (1984)
- OWEN, FRAZER N. Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. *Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen.* **285**, 515, 117-B6 (1984)
- OWENS, A. J. Alfvén Waves in the Solar Wind in Association with Solar Energetic Particles: Sunspot Umbra Origin? *D. J. Mullan and A. J. Owens.* **280**, 346, 52-E10 (1984)
- OWOCKI, S. P. Instabilities in Line-driven Stellar Winds. I. Dependence on Perturbation Wavelength. *S. P. Owocki and G. B. Rybicki.* **284**, 337, 101-F2 (1984)
- OZA, D. H. High Energy Collision Strengths and Limits of Excitation of Hydrogenic Ions by Electron Impact. *D. H. Oza.* **54**, 395, 7-B8 (1984) (Abstr. in **277**, 907, 22-A8)
- PACIESAS, W. S. The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury.* **278**, 112, 25-C4 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. *J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes.* **279**, 177, 39-A1 (1984)
- PACINI, F. The Evolution of Nonthermal Supernova Remnants. II. Can Radio Supernovae Become Plerions? *R. Bandiera, F. Pacini, and M. Salvati.* **285**, 134, 111-D6 (1984)
- PACZYŃSKI, BOHDAN. Ages of Globular Clusters from Their Luminosity Functions. *Bohdan Paczyński.* **284**, 670, 106-D1 (1984)
- Effects of Encounters with Field Stars on the Evolution of Low-Mass Semidetached Binaries. *Piet Hut and Bohdan Paczyński.* **284**, 675, 106-D6 (1984)
- Helium Content of the Population II Binary System CM Draconis. *Bohdan Paczyński and Ryszard Stenkiewicz.* **286**, 332, 125-E3 (1984)
- PAGE, THORNTON. The S201 Far-Ultraviolet Imaging Survey. II. A Field in Cygnus. *George R. Carruthers and Thornton Page.* **54**, 271, 5-C2 (1984) (Abstr. in **276**, 799, 10-B11)
- The S201 Far-Ultraviolet Imaging Survey. III. A Field in Sagittarius. *George R. Carruthers and Thornton Page.* **55**, 101, 12-A3 (1984) (Abstr. in **279**, 911, 47-G2)
- PALMER, LEIGH H. Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. *Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry.* **282**, 226, 76-D2 (1984)
- PALMER, LEIGH HUNT. The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley.* **285**, 202, 112-B8 (1984)
- PALTOGLOU, G. Kinematics of Galactic Globular Clusters. *A. W. Rodgers and G. Paltoglou.* **283**, L5, 91-E8 (1984)
- PANAGIA, N. Radio Emission from a Type I Supernova: SN 1983.51 in NGC 5236. *R. A. Sramek, N. Panagia, and K. W. Weiler.* **285**, L59, 121-E2 (1984)
- Extinction in Inhomogeneous Clouds. *A. Natta and N. Panagia.* **287**, 228, 135-D6 (1984)
- PANAGIA, NINO. Ultraviolet Radiation from White Dwarfs and the Carbon Ionization in the Galactic Halo. *Nino Panagia and Yervant Terzian.* **287**, 315, 136-D5 (1984)
- PANCHAPAKESAN, N. Gamma-Rays from Rotating Black Holes. *N. Panchapakesan and Vijay Prakash.* **280**, 848, 59-A14 (1984)
- PANEK, R. J. Ultraviolet Spectroscopy of the Dwarf Nova U Geminorum. *R. J. Panek and A. V. Holm.* **277**, 700, 19-F11 (1984)
- PANEK, ROBERT J. Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si IV Stellar Wind Effect. *Nolan R. Walborn and Robert J. Panek.* **280**, L27, 54-E3 (1984)
- Ultraviolet Spectral Morphology of the O Stars. II. The Main Sequence. *Nolan R. Walborn and Robert J. Panek.* **286**, 718, 131-A4 (1984)
- PAPALOIZOU, JOHN. On the Tidal Interaction between Protoplanets and the Primordial Solar Nebula. I. Linear Calculation of the Role of Angular Momentum Exchange. *John Papaloizou and D. N. C. Lin.* **285**, 818, 120-D4 (1984)
- PARKER, E. N. The Role of Flux Ejection in Stellar Dynamics. *E. N. Parker.* **276**, 341, 4-E1 (1984)
- Depth of Origin of Solar Active Regions. *E. N. Parker.* **280**, 453, 53-E5 (1984)
- Magnetic Buoyancy and the Escape of Magnetic Fields from Stars. *E. N. Parker.* **281**, 839, 71-F2 (1984)
- Stellar Fibril Magnetic Systems. I. Reduced Energy State. *E. N. Parker.* **283**, 343, 89-F9 (1984)
- Magnetic Fields in the Radiative Interior of Stars. I. Thermal Shadows and Forced Convection. *E. N. Parker.* **286**, 666, 130-D8 (1984)
- Magnetic Fields in the Radiative Interior of Stars. II. Forced Convection and the ^7Li Abundance. *E. N. Parker.* **286**, 677, 130-E5 (1984)
- PARMAR, A. N. SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. *A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley.* **279**, 866, 47-C8 (1984)
- Evidence for 4.4 Hour Periodic Dips in the X-Ray Flux from 4U 1755–33. *N. E. White, A. N. Parmar, M. Sztajno, H. U. Zimmermann, K. O. Mason, and S. M. Kahn.* **283**, L9, 91-E11 (1984)
- PARSONS, SIDNEY B. The Chromospheres of Classical Cepheids. II. High-Resolution Profiles of the Mg II h and k Lines. *Edward G. Schmidt and Sidney B. Parsons.* **279**, 202, 39-C1 (1984)
- The Chromospheres of Classical Cepheids. III. A Search for Transition

- Region Emission Lines. *Edward G. Schmidt and Sidney B. Parsons.* **279**, 215, 39-D2 (1984)
- Ultraviolet and Optical Studies of Binaries with Luminous Cool Primaries and Hot Companions. III. Reticon Radial Velocities: Erratum. *Sidney B. Parsons.* **54**, 372, 6-C10 (1984) (Orig. paper in **53**, 553, 24-E1)
- PARTOVI, M. HOSSEIN. Toward Verification of Large-Scale Homogeneity in Cosmology. *M. Hossein Partovi and Bahram Mashoon.* **276**, 4, 1-A9 (1984)
- PARTRIDGE, R. B. Limits of Arcsecond-Scale Fluctuations in the Cosmic Microwave Background. *J. E. Knoke, R. B. Partridge, M. I. Ratner, and I. I. Shapiro.* **284**, 479, 104-D3 (1984)
- PATTERSON, A. Flares in Hale 17760: Magnetic Transients in the 1981 July 27 Flare. *A. Patterson.* **280**, 884, 59-D8 (1984)
- PATTERSON, J. Identification of Two Hard X-Ray Emitting Be Stars Using the *HEAO 1* Scanning Modulation Collimator. *J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock.* **280**, 688, 7-C14 (1984)
- PATTERSON, JOSEPH. VV Puppis: The Soft X-Ray Machine. *Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White.* **279**, 785, 46-D3 (1984)
- The Evolution of Cataclysmic and Low-Mass X-Ray Binaries. *Joseph Patterson.* **54**, 443, 8-A8 (1984) (Abstr. in **278**, 894, 35-E12)
- PATUREL, G. The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. *L. Bottinelli, L. Gouguenheim, G. Patutel, and G. de Vaucouleurs.* **280**, 34, 49-C14 (1984)
- Direct Determination of Extragalactic Distances from the 21 Centimeter Line Width and the Method of the "Sesies". *G. Patutel.* **282**, 382, 79-B12 (1984)
- PAUL, JACQUES. An Identification for "Gemina" (2CG 195 + 04): The Optical Counterpart of 1E 0630 + 178, A Unique Object in the Gamma-Ray Source Error Box. *Patrizia A. Caraveo, Giovanni F. Bignami, Laurent Vigroux, and Jacques A. Paul.* **276**, 145, 10-F2 (1984)
- PAYNE, H. E. The Spectral Evolution of Low-Frequency Variable Radio Sources. *Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon.* **281**, L55, 73-A4 (1984)
- PECK, MICHAEL C. High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. *John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio.* **279**, 685, 45-C12 (1984)
- PECYNER, RUBEN. Oscillator Strengths of the C_2 $A^1\Pi_g-X^1\Sigma^+$ Phillips System. *Sumner P. Davis, Wm. Hayden Smith, James W. Brault, Ruben Pecyner, and Jeremy Wagner.* **287**, 455, 137-G7 (1984)
- PEDERSEN, H. Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs.* **283**, 774, 95-D3 (1984)
- PEDREROS, MARIO. Photographic Photometry of the Open Cluster NGC 7790. *Mario Pedreros, Barry F. Madore, and Wendy L. Freedman.* **286**, 563, 129-C13 (1984)
- PEEBLES, P. J. E. Dark Matter and the Origin of Galaxies and Globular Star Clusters. *P. J. E. Peebles.* **277**, 470, 17-C2 (1984)
- Tests of Cosmological Models Constrained by Inflation. *P. J. E. Peebles.* **284**, 439, 104-A5 (1984)
- PEKAREVICH, MIRIAM. Line Locking and SS 433. *Miriam Pekarevich, Tsvi Piran, and Jacob Shaham.* **283**, 295, 88-C3 (1984)
- PELLAT, R. Stability of Gravitational Systems and Gravothermal Catastrophe in Astrophysics. *J. F. Sygnet, G. Des Forêts, M. Lachèze-Rey, and R. Pellat.* **276**, 737, 9-E5 (1984)
- Importance of Transverse Diffusion for Cosmic-Ray Propagation. *P. Barge, J. Millet, and R. Pellat.* **284**, 817, 108-A1 (1984)
- PELLING, R. M. Solar Hard X-Ray Microflares. *R. P. Lin, R. A. Schwartz, S. R. Kane, R. M. Pelling, and K. C. Hurley.* **283**, 421, 90-E13 (1984)
- The *HEAO 1* A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson.* **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- PENNING, WILLIAM R. PG 1012 - 029: A High-Excitation Eclipsing Cataclysmic Variable. *William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green.* **276**, 233, 3-D5 (1984)
- PEPPER, G. H. Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson.* **276**, 572, 7-G4 (1984)
- SiO Flux Measurements of Variable Stars. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson.* **283**, 174, 88-A2 (1984)
- PERLEY, R. A. The Jet and Filaments in Cygnus A. *R. A. Perley, J. W. Dreher, and J. J. Cowan.* **285**, L35, 115-A5 (1984)
- High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis.* **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)
- PERLEY, RICK. 3C 111: A Luminous Radio Galaxy with a Highly Collimated Jet. *Roger Linfield and Rick Perley.* **279**, 60, 37-E14 (1984)
- PERRIER, C. The Sub-Arc Second Structure of IRc2 at 5 Microns. *A. Chelli, C. Perrier, and P. Lena.* **280**, 163, 50-F14 (1984)
- PERRY, J. J. The Rotation Measure Distribution of QSOs and of Intervening Clouds: Magnetic Fields and Column Densities. *G. L. Welter, J. J. Perry, and P. P. Kronberg.* **279**, 19, 37-B11 (1984)
- PERRY, MARCUS L. Magnetic Field Structure in the Taurus Dark Cloud. *Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry.* **282**, 508, 80-F4 (1984)
- PERRYMAN, M. A. C. [O III] Emission Surrounding the Quasar MR 2251-178. *S. di Serego Alighieri, M. A. C. Perryman, and F. Macchetto.* **285**, 567, 117-F10 (1984)
- PERSSON, S. E. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult.* **276**, 533, 7-D4 (1984)
- The Clusters of M33. *J. G. Cohen, S. E. Persson, and L. Searle.* **281**, 141, 62-D10 (1984)
- IUE Observations of the Clusters of the Magellanic Clouds. *J. G. Cohen, R. M. Rich, and S. E. Persson.* **285**, 595, 118-A12 (1984)
- Brackett-Alpha Line Profiles of Young Stellar Objects. *S. E. Persson, T. R. Geballe, Peter J. McGregor, Suzan Edwards, and Carol J. Lonsdale.* **286**, 289, 125-A14 (1984)
- Spectrophotometry of Compact Embedded Infrared Sources in the 0.6-1.0 Micron Wavelength Region. *P. J. McGregor, S. E. Persson, and J. G. Cohen.* **286**, 609, 129-G4 (1984)
- Infrared Observations of Interacting/Merging Galaxies. *Carol J. Lonsdale, S. E. Persson, and K. Matthews.* **287**, 95, 134-A7 (1984)
- PESCH, PETER. The Case Low-Dispersion Northern Sky Survey. II. *N. Sanduleak and Peter Pesch.* **55**, 517, 17-F13 (1984) (Abstr. in **281**, 892, 72-C5)
- PESNELL, W. D. Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. *Summer Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell.* **281**, 800, 71-C4 (1984)
- PESNELL, W. DEAN. Critique of the Iterative Theory of Stellar Pulsations. *J. Robert Buchler and W. Dean Pesnell.* **283**, 316, 89-D10 (1984)
- Thermal Response of Stellar Envelopes during Nonradial Pulsations. *W. Dean Pesnell.* **285**, 778, 120-A4 (1984)
- Rotational Mode Splitting about an Inclined Axis. *Morris L. Aizenman, Carl J. Hansen, John P. Cox, and W. Dean Pesnell.* **286**, L43, 132-D13 (1984)
- PETERS, GERALDINE J. Evidence for a High-Temperature Accretion Region in Algol-Type Binary Systems. *Geraldine J. Peters and Ronald S. Polidan.* **283**, 745, 95-B1 (1984)
- PETERS, W. L. The Dependence on Distance and Redshift of the Velocity Vectors of the Sun, the Galaxy, and the Local Group with Respect to Different Extragalactic Frames of Reference. *G. de Vaucouleurs and W. L. Peters.* **287**, 1, 133-A6 (1984)
- PETERSON, B. M. Are Forbidden Lines Present in the Optical Spectrum of the QSO 3C 273? *B. M. Peterson, K. A. Meyers, and E. R. Capriotti.* **283**, 529, 92-E12 (1984)
- PETERSON, BRADLEY M. Variability of the Emission-Line Spectra and Optical Continuum of Seyfert Galaxies. II. *Bradley M. Peterson, Craig B. Foltz, D. Michael Crenshaw, Karie A. Meyers, and Paul L. Byard.* **279**, 529, 43-E13 (1984)
- PETERSON, BRUCE A. Redshifts of Southern Radio Sources. VI. *David L. Jauncey, Michael J. Barry, Alan E. Wright, Bruce A. Peterson, and Ann Savage.* **286**, 498, 128-E8 (1984)
- PETERSON, L. E. The *HEAO 1* A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson.* **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- PETERSON, RUTH C. The Blue Stragglers of M67. *Ruth C. Peterson, Bruce W. Carney, and David W. Latham.* **279**, 237, 39-E13 (1984)
- PETRE, R. Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. *R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt.* **280**, 499, 55-C11 (1984)
- PETRO, L. D. Optical Identification of 2S 1417 - 62. *J. E. Grindlay, L. D. Petro, and J. E. McClintock.* **276**, 621, 8-C11 (1984)
- A Study of Solar Photospheric Limb-Darkening Variations. *L. D.*

- Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce. **283**, 426, 90-F4 (1984)
- Cygnus X-2: Neutron Star or Degenerate Dwarf? J. E. McClintock, L. D. Petro, G. Hammerschlag-Hensberge, C. R. Proffitt, and R. A. Remillard. **283**, 794, 95-E9 (1984)
- PETROV, YU. V. The Effect of Inelastic Neutron Acceleration by Isomeric Nuclei on the s -Process Nucleosynthesis. Yu. V. Petrov and A. I. Shlyakhter. **278**, 385, 28-B8 (1984)
- PETTERSEN, BJØRN R. Chromospheric Lines in Red Dwarf Flare Stars. II. EV Lacertae, EQ Pegasi A, and V1054 Ophiuchi. Bjørn R. Pettersen, David S. Evans, and Lawrence A. Coleman. **282**, 214, 76-C4 (1984)
- The Flare Activity of AD Leonis. Bjørn R. Pettersen, Lawrence A. Coleman, and David S. Evans. **54**, 375, 7-A2 (1984) (Abstr. in **277**, 907, 22-A8)
- PETTINI, M. On the Photoproduction of Triply Ionized Carbon and Silicon in the Galactic Halo. T. W. Hartquist, M. Pettini, and A. Tarrant. **276**, 519, 7-C4 (1984)
- PHILIP, A. G. DAVIS. On the Metallicity of Blue Horizontal-Branch Stars in M4 and NGC 6397. K. Kodaira and A. G. Davis Philip. **278**, 201, 26-B12 (1984)
- High-Dispersion Spectroscopic Investigation of Field Horizontal-Branch, High-Luminosity, and Main-Sequence Stars. K. Kodaira and A. G. Davis Philip. **278**, 208, 26-C6 (1984)
- PHILLIPS, K. J. H. SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley. **279**, 866, 47-C8 (1984)
- PHILLIPS, M. M. Coordinated UV and Optical Observations of the AM Herculis Object EI405 - 451 in the High and Low States. L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips. **285**, 214, 112-C6 (1984)
- The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 - 65. R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips. **286**, 464, 128-B10 (1984)
- PHILLIPS, R. B. VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips. **278**, 220, 26-D4 (1984)
- PHILLIPS, ROBERT B. Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips. **279**, 184, 39-A8 (1984)
- Detection of a Sub-Milliarsecond Radio Component in the RS CVn System 1099. Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston. **282**, L23, 78-B12 (1984)
- PHILLIPS, T. G. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- On the Interpretation of the Broad-Band Millimeter-Wave Flux from Orion. E. C. Sutton, Geoffrey A. Blake, C. R. Masson, and T. G. Phillips. **283**, L41, 97-B4 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- ¹³CH₃OH in OMC-1. Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia. **286**, 586, 129-E8 (1984)
- PICA, A. J. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- PICK, M. Coronal Extension of Flaring Region Magnetic Fields Inferred from High-Resolution Microwave and Type III Burst Observations. P. Lantos, M. Pick, and M. R. Kundu. **283**, L71, 97-D7 (1984)
- PIER, JEFFREY R. AB Stars in the Southern Galactic Halo. III. Kinematics of the Halo. Jeffrey R. Pier. **281**, 260, 63-F8 (1984)
- PIERCE, A. K. A Study of Solar Photospheric Limb-Darkening Variations. L. D. Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce. **283**, 426, 90-F4 (1984)
- PILACHOWSKI, CATHERINE A. The Chemical Composition of Globular Clusters: Global Trends. Catherine A. Pilachowski. **281**, 614, 69-C6 (1984)
- Abundances of Distant Classical Cepheid Variables. Hugh C. Harris and Catherine A. Pilachowski. **282**, 655, 82-B13 (1984)
- The Abundance of Lithium in the Old Galactic Cluster NGC 7789. Catherine A. Pilachowski, Jeremy R. Mould, and Michael J. Siegel. **282**, L17, 78-B7 (1984)
- PILCHER, C. B. Io's Sodium Directional Features: Evidence for a Magnetospheric-Wind-driven Gas Escape Mechanism. C. B. Pilcher, W. H. Smyth, M. R. Combi, and J. H. Kertel. **287**, 427, 137-E7 (1984)
- PINES, D. Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **276**, 325, 4-C13 (1984)
- Vortex Creep and the Internal Temperature of Neutron Stars. II. Vela Pulsar. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **278**, 791, 34-E5 (1984)
- PINTO, JOSEPH P. Photochemistry of the Atmosphere of Titan: Comparison between Model and Observations. Yuk L. Yung, Mark Allen, and Joseph P. Pinto. **55**, 465, 17-C3 (1984) (Abstr. in **281**, 892, 72-C5)
- PIPHER, J. L. Abundances in Galactic H II Regions. III. G25.4 - 0.2, G45.5 + 0.06, M8, S159, and DR 22. J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones. **285**, 174, 111-G5 (1984)
- PIPHER, JUDITH L. Magnetic Field Structure in the Taurus Dark Cloud. Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry. **282**, 508, 80-F4 (1984)
- PIRAN, TSVI. Local Stability of Thick Accretion Disks. I. Basic Equations and Parallel Perturbations in the Negligible Viscosity Case. Marek A. Abramowicz, Mario Livio, Tsvi Piran, and Paul J. Witta. **279**, 367, 41-A6 (1984)
- Line Locking and SS 433. Miriam Pekarevich, Tsvi Piran, and Jacob Shaham. **283**, 295, 88-C3 (1984)
- PISARSKI, RYSZARD. Einstein Observations of the Cygnus Loop. William H.-M. Ku, Steven M. Kahn, Ryszard Pisarski, and Knox S. Long. **278**, 615, 32-E13 (1984)
- PISARSKI, RYSZARD L. An X-Ray Study of the Remnant of SN 185 A.D. Ryszard L. Pisarski, David J. Helfand, and Steven M. Kahn. **277**, 19-G7 (1984)
- PLAMBECK, R. L. Interaction of the Outflow and Quiescent Gas in Orion: HCO⁺ Aperture Synthesis Maps. S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch. **283**, 655, 94-B2 (1984)
- PLAVEC, MIREK J. Einstein Observations of Selected Close Binaries and Shell Stars. Edward F. Guinan, Robert H. Koch, and Mirek J. Plavec. **282**, 667, 82-C11 (1984)
- PLUMMER, GRANT M. Laboratory Submillimeter Transition Frequencies of ⁷LiH and ⁶LiH. Grant M. Plummer, Eric Herbst, and Frank C. De Lucia. **282**, L113, 85-F1 (1984)
- ¹³CH₃OH in OMC-1. Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia. **286**, 586, 129-E8 (1984)
- Laboratory Millimeter and Submillimeter Spectra of HNO and DNO. K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- The Millimeter and Submillimeter Laboratory Spectrum of Methyl Formate in its Ground Symmetric Torsional State. Grant M. Plummer, Eric Herbst, Frank C. De Lucia, and Geoffrey A. Blake. **55**, 633, 20-C10 (1984) (Abstr. in **282**, 821, 84-A11)
- PNEUMAN, G. W. Diamagnetic Propulsion and Energy Balance of Magnetic Elements in the Solar Chromosphere and Transition Region. P. J. Cargill and G. W. Pneuman. **276**, 369, 4-G1 (1984)
- POLAND, A. I. The Energy Relation between Hard X-Ray and O V Emission in Solar Flares. A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer. **280**, 457, 53-G11 (1984)
- POLCARO, V. F. Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda. **279**, 515, 43-D13 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda. **284**, 54, 98-E3 (1984)
- POLIDAN, R. S. Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenliid. **281**, 766, 70-G8 (1984)
- POLIDAN, RONALD S. Evidence for a High-Temperature Accretion Region in Algol-Type Binary Systems. Geraldine J. Peters and Ronald S. Polidan. **283**, 745, 95-B1 (1984)
- Circumstellar Material around Rapidly Rotating B Stars. II. On the Nature of Ultraviolet Shell Lines in the Spectra of Be and Shell Stars. William R. Oegerle and Ronald S. Polidan. **285**, 648, 118-E9 (1984)

- POLITZER, H. DAVID. Relations between Spatial Correlations of Rich Clusters of Galaxies. *H. David Politzer and Mark B. Wise*. **285**, L1, 114-F3 (1984)
- POLLOCK, J. T. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock*. **278**, 521, 31-E14 (1984)
- PONGRATZ, MORRIS B. The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. *Joseph E. Borovsky, Morris B. Pongratz, Robert A. Roussel-Dupr , and Tai-Ho Tan*. **280**, 802, 58-E10 (1984)
- POPPER, DANIEL M. Absolute Dimensions and Masses of Eclipsing Binaries. IV. EE Pegasi is a Triple Star. *Claud H. Lacy and Daniel M. Popper*. **281**, 268, 63-G2 (1984)
- S Cancri: A Semidetached System with a Very Low Mass Secondary. *Daniel M. Popper and Jocelyn Tomkin*. **285**, 208, 112-B14 (1984)
- PORCAS, R. W. The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney*. **287**, 538, 140-A11 (1984)
- PORTER, JASON G. Frequent Ultraviolet Brightenings Observed in a Solar Active Region with Solar Maximum Mission. *Jason G. Porter, Juri Toomre, and Katharine B. Gebbie*. **283**, 879, 96-D14 (1984)
- PORRILL, MIQUEL. Long-Term Post-Newtonian Effects in a Binary System. *Miquel Porrill and Ramon Lapidra*. **286**, 633, 130-B3 (1984)
- POSTMAN, M. The Morphology-Density Relation: The Group Connection. *M. Postman and M. J. Geller*. **281**, 95, 62-A6 (1984)
- POTTASCH, S. R. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- IRAS Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius*. **278**, L33, 29-E7 (1984)
- IRAS Observations of OH/IR Stars. *F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch*. **278**, L41, 29-E13 (1984)
- PRAKASH, VIJOY. Gamma-Rays from Rotating Black Holes. *N. Panchapakesan and Vijoy Prakash*. **280**, 848, 59-A14 (1984)
- PRANTZOS, N. Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. *J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boctel, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes*. **279**, 177, 39-A1 (1984)
- PRASAD, S. S. The Chemistry of Phosphorus in Dense Interstellar Clouds. *L. R. Thorne, V. G. Anicich, S. S. Prasad, and W. T. Huntress, Jr.* **280**, 139, 50-E3 (1984)
- PRAVDO, S. H. New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Dieter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yentis*. **283**, L53, 97-C2 (1984)
- PRAVDO, STEVEN H. Soft X-Ray Active Galactic Nuclei. *Steven H. Pravdo and Francis E. Marshall*. **281**, 570, 68-G12 (1984)
- X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. *John J. Nugent, Steven H. Pravdo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler*. **284**, 612, 105-F13 (1984)
- PREDMORE, C. READ. Time Variability of the 87 GHz Linear Polarization and Flux Density of Active Extragalactic Objects. *Richard Barvainis and C. Read Predmore*. **282**, 402, 79-D6 (1984)
- PREITE-MARTINEZ, A. Nonequilibrium Analysis of Supernova Remnants in the Large Magellanic Cloud. *R. Fusco-Femiano and A. Preite-Martinez*. **281**, 593, 69-A13 (1984)
- PRESTON, R. A. The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney*. **287**, 538, 140-A11 (1984)
- PRESTON, ROBERT A. Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. *Jean-Fran ois Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips*. **279**, 184, 39-A8 (1984)
- Detection of a Sub-Milliarcsecond Radio Component in the RS CVn System 1099. *Jean-Fran ois Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston*. **282**, L23, 78-B12 (1984)
- A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. *Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin J. Shapiro, Alan E. E. Rogers, and Antonio Rius*. **284**, 519, 104-G1 (1984)
- PRIALNIK, DINA. The Effect of Diffusion on Prenova Evolution: CNO-enriched Envelopes. *Dina Prialnik and Attay Kovetz*. **281**, 367, 65-A1 (1984)
- Diffusion in a Thermally Pulsating Star. *Attay Kovetz, Dina Prialnik, and Giora Shaviv*. **282**, 584, 81-D10 (1984)
- PRIEDHORSKY, W. Discovery of a 176 Day Period in 4U 1820 - 30. *W. Friedhorsky and J. Terrell*. **284**, L17, 103-B4 (1984)
- PRIEDHORSKY, W. C. Long-Term Observations of X-Ray Sources: The Aquila-Serpens-Scutum Region. *W. C. Friedhorsky and J. Terrell*. **280**, 661, 57-A14 (1984)
- PRIEDHORSKY, WILLIAM C. The 1973 X-Ray Transient V0332 + 53. *James Terrell and William C. Friedhorsky*. **285**, L15, 114-G1 (1984)
- PRIMINI, F. A. Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. *W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini*. **279**, 555, 44-A1 (1984)
- HEAO 1 High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). *B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primini, and W. H. G. Lewin*. **285**, 258, 112-F9 (1984)
- The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson*. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- PRITCHETT, CHRISTOPHER J. Luminous Late-Type Stars in NGC 205. *Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett*. **287**, 138, 134-D9 (1984)
- PROFFITT, C. R. Cygnus X-2: Neutron Star or Degenerate Dwarf? *J. E. McClintock, L. D. Petro, G. Hammerschlag-Hensberge, C. R. Proffitt, and R. A. Remillard*. **283**, 794, 95-E9 (1984)
- PROFFITT, CHARLES. The Problem of the Barium Stars. *Erika B hm-Vitense, James Nemec, and Charles Proffitt*. **278**, 726, 33-G6 (1984)
- PROTHEROE, R. J. First Observation of Gamma-Rays from Vela X-1 at Energies Greater than 3×10^{15} eV. *R. J. Protheroe, R. W. Clay, and P. R. Gerhardt*. **280**, 147, 60-D10 (1984)
- PRYOR, CARLTON. Constraints on the Anisotropy of the Velocity Dispersion of the Coma Cluster. *Carlton Pryor and Margaret J. Geller*. **278**, 457, 31-A5 (1984)
- PTAK, ROGER. C IV $\lambda 1550$ Emission Profiles in IUE Spectra of Seyfert 1 Galaxies. *Ronald Stoner and Roger Ptak*. **280**, 516, 55-D14 (1984)
- The Variable Component of the NGC 4151 IUE Spectrum: Evidence for an Expanding Spherical Emission Shell. *Ronald Stoner, Roger Ptak, and Stephen Gregory*. **285**, 69, 110-F9 (1984)
- PUEETTER, R. C. He I $\lambda 10830$ Emission in Seyfert Galaxies and QSOs. *P. D. LeVan, R. C. Puetter, Harding E. Smith, and Richard J. Rudy*. **284**, 23, 98-B14 (1984)
- PURTON, C. R. The Radio Structure of HM Sagittae. *Sun Kwok, R. C. Bignell, and C. R. Purton*. **279**, 188, 39-A12 (1984)
- PUSCHELL, J. J. Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock*. **278**, 521, 31-E14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordoba, and K. O. Mason*. **284**, 512, 104-F8 (1984)
- Multifrequency Spectral Behavior of the BL Lacertae Objects OI 90.4 and 3C 66A. *D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinosa, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller*. **286**, 711, 131-G11 (1984)
- PUSCHELL, JEFFREY J. Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. *Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen*. **285**, 515, 117-B6 (1984)
- PYLE, K. R. Shock Acceleration of Nuclei and Electrons in the Heliosphere beyond 24 AU. *K. R. Pyle, J. A. Simpson, A. Barnes, and J. D. Mihalov*. **282**, L107, 85-E9 (1984)
- QUIGLEY, ROBERT J. The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley*. **285**, 202, 112-B8 (1984)

- QUINN, P. J. On the Formation and Dynamics of Shells around Elliptical Galaxies. *P. J. Quinn*. **279**, 596, 44-C14 (1984)
- RAASSEN, A. J. J. Calculations of Transition Probabilities for Forbidden Lines in the $3d^7$ Ground Configurations of Co III and Ni IV. *J. E. Hansen, A. J. J. Raassen, and P. H. M. Uylings*. **277**, 435, 15-E13 (1984)
- RABIN, DOUGLAS. Heating the Sun's Lower Transition Region with Fine-Scale Electric Currents. *Douglas Rabin and Ronald Moore*. **285**, 359, 113-G5 (1984)
- A Case for Submergence of Magnetic Flux in a Solar Active Region. *Douglas Rabin, Ronald Moore, and M. J. Hagyard*. **287**, 404, 137-C12 (1984)
- RABOLLI, M. Globular Cluster Swapping in Clusters of Galaxies. *J. C. Muzzio, R. E. Martinez, and M. Rabolli*. **285**, 7, 110-A12 (1984)
- RADOSTITZ, J. V. Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radostitz*. **280**, 102, 50-B7 (1984)
- RAIMOND, E. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- IRAS Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius*. **278**, L33, 29-E7 (1984)
- Infrared Emission from M31. *H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer*. **278**, L59, 30-A1 (1984)
- IRAS Observations of Shapley-Ames Galaxies. *T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond*. **278**, L67, 30-C1 (1984)
- RALLIS, ANDREW D. X-Ray Observations of M33 with the High Resolution Imager on the Einstein Observatory: Erratum. *Thomas H. Markert and Andrew D. Rallis*. **282**, 359, 77-F9 (1984) (Orig. paper in **275**, 571, 143-F14)
- RAMATY, R. Nuclear Processes in the Jets of SS 433. *R. Ramaty, B. Kozlovsky, and R. E. Lingenfelter*. **283**, L13, 91-F1 (1984)
- RAMSEY, LAWRENCE W. A Spectroscopic Study of the Peculiar Giant FK Comae. I. The Radial Velocity Variation and Its Implications. *James K. McCarthy and Lawrence W. Ramsey*. **283**, 200, 88-B14 (1984)
- RANKIN, JOANNA M. Pulsar Polarization Fluctuations. I. 1404 MHz Statistical Summaries. *Daniel R. Stinebring, J. M. Cordes, Joanna M. Rankin, J. M. Weisberg, and Valentin Boriakoff*. **55**, 247, 14-D9 (1984) (Abstr. in **280**, 939, 60-B3)
- Pulsar Polarization Fluctuations. II. 800 MHz Statistical Summaries. *Daniel R. Stinebring, J. M. Cordes, J. M. Weisberg, Joanna M. Rankin, and Valentin Boriakoff*. **55**, 279, 14-G7 (1984) (Abstr. in **280**, 939, 60-B3)
- RAPLEY, C. G. SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. *A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley*. **279**, 866, 47-C8 (1984)
- RAPPAPORT, S. The Lower Main Sequence and the Nature of Secondary Stars in Ultracompact Binaries. *S. Rappaport and P. C. Joss*. **283**, 232, 88-E5 (1984)
- RATCLIFF, S. Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. *D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu*. **276**, 92, 2-A1 (1984)
- RATCLIFF, STEPHEN J. Stellar Orbits in Angle Variables. *Stephen J. Ratcliff, Kar Man Chang, and M. Schwarzschild*. **279**, 610, 44-D14 (1984)
- RATNER, M. I. Limits of Arcsecond-Scale Fluctuations in the Cosmic Microwave Background. *J. E. Knoke, R. B. Partridge, M. I. Ratner, and I. I. Shapiro*. **284**, 479, 104-D3 (1984)
- RAY, A. Rotating Neutron Star Structure: Implications of the Millisecond Pulsar PSR 1937 + 214. *A. Ray and B. Datta*. **282**, 542, 81-A10 (1984)
- The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. *G. Channugam and A. Ray*. **285**, 252, 112-F3 (1984)
- Electron Capture Supernovae: One-Zone Collapse Calculation for Stars with Masses $10 M_{\odot}$ and $15 M_{\odot}$. *A. Ray, S. M. Chitre, and K. Kar*. **285**, 766, 119-G6 (1984)
- RAYMOND, J. C. A High-Resolution Study of Herbig-Haro Objects 1 and 2. *L. Hartmann and J. C. Raymond*. **276**, 560, 7-F4 (1984)
- VV Puppis: The Soft X-Ray Machine. *Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White*. **279**, 785, 46-D3 (1984)
- RAYMOND, JOHN C. Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. *Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman*. **278**, 255, 26-F11 (1984)
- IUE Observations of Centaurus X-4 during the 1979 May Outburst. *William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank*. **278**, 270, 27-A1 (1984)
- Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. *William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull*. **279**, 708, 45-E7 (1984)
- Ultraviolet and Visible Flare Observations of EQ Pegasi B. *Sallie L. Balunas and John C. Raymond*. **282**, 728, 83-A10 (1984)
- Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XII Lines. *George L. Withbroe and John C. Raymond*. **285**, 347, 13-F7 (1984)
- REED, J. A. Double Faraday Rotation toward 3C 27. *S. J. Goldstein, Jr. and J. A. Reed*. **283**, 540, 92-F9 (1984)
- REFLOCH, A. A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognoz 7) Satellite Experiment. *P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, J. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky*. **285**, L67, 121-E10 (1984)
- REID, NEILL. The Evolution of Asymptotic Giant Branch Stars in the Large Magellanic Cloud. *Neill Reid and Jeremy Mould*. **284**, 98, 99-A14 (1984)
- REMILLARD, R. A. Cygnus X-2: Neutron Star or Degenerate Dwarf? *J. E. McClintock, L. D. Petro, G. Hammerschlag-Hensberge, C. R. Proffitt, and R. A. Remillard*. **283**, 794, 95-E9 (1984)
- REMILLARD, RONALD A. SAS 3 Observations of Cygnus X-1: The Intensity Dips. *Ronald A. Remillard and Claude R. Canizares*. **278**, 761, 34-C3 (1984)
- RENGARAJAN, T. N. Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. *S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley*. **279**, 162, 38-F11 (1984)
- Far-Infrared and CO Observations of the W33 Complex. *M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino*. **283**, 573, 93-B4 (1984)
- Age-Rotation Relationship for Late-Type Main-Sequence Stars. *T. N. Rengarajan*. **283**, L63, 97-C14 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. *T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen*. **286**, 573, 129-D9 (1984)
- An Estimate of Star Formation Efficiency in Molecular Clouds. *T. N. Rengarajan*. **287**, 671, 141-E12 (1984)
- RENSING, MICHAEL. Spectroscopic Studies of Wolf-Rayet Stars with Absorption Lines. VIII. HD 193793. *Peter S. Conti, Diane Roussel-Dupré, Philip Massey, and Michael Rensing*. **282**, 693, 82-E11 (1984)
- REUTER, D. C. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. *S. J. Daunt, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault*. **280**, 921, 59-G9 (1984)
- REYNOLDS, R. J. A Measurement of the Hydrogen Recombination Rate in the Diffuse Interstellar Medium. *R. J. Reynolds*. **282**, 191, 76-A9 (1984)
- REYNOLDS, S. P. Evolution of Pulsar-driven Supernova Remnants. *S. P. Reynolds and R. A. Chevalier*. **278**, 630, 32-G7 (1984)
- REYNOLDS, STEPHEN P. On the X-Ray Emission from Crab-like Supernova Remnants. *Stephen P. Reynolds and Gary A. Chanan*. **281**, 673, 69-G10 (1984)
- A New Type of Extended Nonthermal Radio Emitter: Detection of the Old Nova GK Persei. *Stephen P. Reynolds and Roger A. Chevalier*. **281**, L33, 66-G4 (1984)
- An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 - 693 in the Large Magellanic Cloud. *Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds*. **287**, L23, 138-D9 (1984)
- RICCHIAZZI, PAUL J. A Static Model of Chromospheric Heating in Solar Flares: Erratum. *Paul J. Ricchiazzi and Richard C. Canfield*. **279**, 463, 42-A11 (1984) (Orig. paper in **272**, 739, 109-G5)
- The H α Spectral Signatures of Solar Flare Nonthermal Electrons, Conductive Flux, and Coronal Pressure. *Richard C. Canfield, Todd A. Gunkler, and Paul J. Ricchiazzi*. **282**, 296, 77-B3 (1984)
- RICE, JOHN B. Asymmetries in the Spectral Lines of Procyon and κ Cancri. *John B. Rice and William H. Wehlau*. **278**, 721, 33-G1 (1984)
- RICE, W. The Remarkable Infrared Galaxy Arp 220 = IC 4553. *B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hackney, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson*. **283**, L1, 91-E3 (1984)
- RICHTER, R. M. IUE Observations of the Clusters of the Magellanic Clouds.

- J. G. Cohen, R. M. Rich, and S. E. Persson. **285**, 595, 118-A12 (1984)
Main-Sequence Photometry of the SMC Globular Cluster Kron 3. R. M. Rich, G. S. Da Costa, and J. R. Mould. **286**, 517, 128-G1 (1984)
- RICHARDSON, M. B. Thermal Evolution of Accreting Neutron Stars. Masayuki Y. Fujimoto, Tomoyuki Hanawa, Icko Iben, Jr., and M. B. Richardson. **278**, 813, 34-F13 (1984)
- RICHER, HARVEY B. Deep CCD Photometry in Globular Clusters. I. The Main Sequence of M4. Harvey B. Richer and G. G. Fahlan. **277**, 227, 13-D5 (1984)
Luminous Late-Type Stars in NGC 205. Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett. **287**, 138, 134-D9 (1984)
- RICHSTONE, DOUGLAS O. The Evolution of Clusters of Galaxies. II. Tidal Stripping versus Mergers as a Function of Richness. Eliot M. Malumuth and Douglas O. Richstone. **276**, 413, 6-B2 (1984)
Scale-free Models of Galaxies. III. A Survey of the Oblate E6 Solution Set. Douglas O. Richstone. **281**, 100, 62-A11 (1984)
A General Method for Constructing Spherical Galaxy Models. Douglas O. Richstone and Scott Tremaine. **286**, 27, 122-C3 (1984)
- RICKER, GEORGE R. An Intercontinental Baseline Coincidence Search for Optical Flashes with Two Schmidt Telescopes. Bradley E. Schaefer, Roland Vanderspek, Hale V. Bradt, and George R. Ricker. **283**, 887, 96-E8 (1984)
- RIDGWAY, STEPHEN T. An Atlas of Late-Type Stellar Spectra, 2400–2778 Inverse Centimeters. Stephen T. Ridgway, Duane F. Carbon, Donald N. B. Hall, and Jack Jewell. **54**, 177, 4-A2 (1984) (Abstr. in **276**, 798, 10-B10)
- RIEKE, G. Infrared Emission from Accretion Disks: Detectability and Variability. J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke. **284**, 745, 107-B9 (1984)
- RIEKE, G. H. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner. **280**, 521, 55-E6 (1984)
The Luminous Host Galaxy and Anomalous Brackett-Gamma Line of Markarian 231. Roc M. Cutri, G. H. Rieke, and M. J. Lebofsky. **287**, 566, 140-C12 (1984)
- RIEKE, GEORGE H. Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke. **284**, L5, 103-A6 (1984)
- RIUS, A. VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanroma, and A. Rius. **286**, 503, 128-E13 (1984)
The Milli-arcsecond Images of Q0957 + 561. M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney. **287**, 538, 140-A11 (1984)
- RIVOLO, A. R. Nonlinear Evolution of Superclusters: Erratum. A. R. Rivolo and A. Yahil. **281**, 886, 72-B10 (1984) (Orig. paper in **274**, 474, 130-C8)
- ROBERGE, W. G. CO Line Emission from Shock Waves in Molecular Clouds. B. T. Draine and W. G. Roberge. **282**, 491, 80-E1 (1984)
- ROBERTS, B. On Coronal Oscillations. B. Roberts, P. M. Edwin, and A. O. Benz. **279**, 857, 47-B12 (1984)
- ROBERTS, DANA. Relativistic Jet Meets Target: The Gamma-Rays from 3C 273. Philip Morrison, Dana Roberts, and Alberto Sadun. **280**, 483, 55-B9 (1984)
Constraints on Continuous Beam Models of the Jet in 3C 273. Dana Roberts. **285**, 64, 110-F4 (1984)
- ROBERTS, J. A. High-Resolution Maps of the 1.5 GHz Emission from Jupiter's Disk and Radiation Belt. J. A. Roberts, G. L. Berge, and R. C. Bignell. **282**, 345, 77-E10 (1984)
- ROBERTS, WILLIAM W., JR. Spiral Structure and Star Formation. I. Formation Mechanisms and Mean Free Paths. William W. Roberts, Jr. and Mark Hausman. **277**, 744, 20-C2 (1984)
Spiral Structure and Star Formation. II. Stellar Lifetimes and Cloud Kinematics. Mark A. Hausman and William W. Roberts, Jr. **282**, 106, 75-B4 (1984)
- ROBINSON, B. J. The Distribution of CO in the Galaxy for Longitudes 294° to 86°. B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scofield, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon. **283**, L31, 97-A8 (1984)
- ROBINSON, E. L. PG 1654 + 160: A New Pulsating DB White Dwarf. D. E. Winget, E. L. Robinson, R. E. Nather, and Suchitra Balachandran. **279**, L15, 42-E2 (1984)
Time-resolved Spectroscopy of SS Cygni at Minimum and Maximum Light. F. V. Hessman, E. L. Robinson, R. E. Nather, and E.-H. Zhang. **286**, 747, 131-C8 (1984)
- ROBINSON, EDWARD L. Observations of Quasi-periodic Oscillations in the Light Curve of VW Hydri. Edward L. Robinson and Brian Warner. **277**, 250, 13-E14 (1984)
- ROBINSON, R. D. Associations between Coronal Mass Ejections and Metric Type II Bursts. N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels. **279**, 839, 47-A4 (1984)
- ROBSON, E. I. Millimeter-Wave Observations of Flat Spectrum Radio Sources. W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radostitz. **280**, 102, 50-B7 (1984)
- RODGERS, A. W. Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York. **281**, 585, 69-A5 (1984)
Kinematics of Galactic Globular Clusters. A. W. Rodgers and G. Palatou. **283**, L5, 91-E8 (1984)
- RODRIGUEZ, LUIS F. Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. Jorge Cantó, Luis F. Rodriguez, Nuria Calvet, and Russell M. Leveault. **282**, 631, 82-A1 (1984)
- RODRIGUEZ-ESPINOZA, J. M. Multifrequency Spectral Behavior of the BL Lacertae Objects OJ 90.4 and 3C 66A. D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinoza, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller. **286**, 711, 131-G11 (1984)
- RODRIGUEZ-ESPINOZA, J. M. Position-dependent Infrared Spectroscopy of M82: 100,000 Orion Nebulae? B. Jones and J. M. Rodriguez-Espinoza. **285**, 580, 117-G11 (1984)
- RODRIGUEZ KUIPER, E. N. Methyl Acetylene as a Temperature Probe for Dense Interstellar Clouds. T. B. H. Kuiper, E. N. Rodriguez Kuiper, Dale F. Dickinson, B. E. Turner, and B. Zuckerman. **276**, 211, 3-B9 (1984)
183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann. **283**, 106, 87-B13 (1984)
A Search for 183 GHz Emission from Water in Late-Type Stars. T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodriguez Kuiper, and P. Zimmermann. **286**, 310, 125-C9 (1984)
- ROESLER, F. L. Hydrogen Production Rate from Comet Austin 1982g. P. Shih, F. Scherb, and F. L. Roesler. **279**, 453, 42-A1 (1984)
- ROGERS, A. E. E. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth. **279**, 116, 38-C3 (1984)
The Milli-arcsecond Images of Q0957 + 561. M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney. **287**, 538, 140-A11 (1984)
- ROGERS, ALAN E. E. A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Rius. **284**, 519, 104-G1 (1984)
- ROGERS, C. Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. II. Implementation of the Method. P. G. Martin, C. Rogers, and G. B. Rybicki. **284**, 317, 101-D10 (1984)
Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. III. Numerical Solution and Applications. C. Rogers and P. G. Martin. **284**, 327, 101-E6 (1984)
Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. V. Line Formation in a Static Atmosphere. C. Rogers. **286**, 659, 130-D1 (1984)
- ROMANISHIN, W. Spectrophotometry and Image Analysis of the Nebulosity around the Low-Redshift Quasar 0241 + 622. W. Romanishin, Holland Ford, Robin Ciardullo, and Bruce Margon. **277**, 487, 17-D5 (1984)
- ROMNEY, J. High-Resolution Observations of the Steep Spectrum Source 2147 + 145. W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Bååth, and J. Romney. **277**, L41, 22-E6 (1984)
- ROOD, HERBERT J. Gravitation in the Weak-Field Limit. Herbert J. Rood. **284**, 407, 102-D2 (1984)
X-Ray Emission from Stephan's Quintet and Other Compact Groups. Neta A. Bahcall, D. E. Harris, and Herbert J. Rood. **284**, L29, 109-A12 (1984)
The Intergalactic H I Cloud in Leo: A Spitzer-Baade Collision Product? Herbert J. Rood and B. A. Williams. **285**, L5, 114-F6 (1984)
- ROOD, ROBERT T. The 8.7 GHz Hyperfine Line of ³He⁺ in Galactic H II Regions. Robert T. Rood, T. M. Bania, and T. L. Wilson. **280**, 629, 56-F7 (1984)
- ROSE, JAMES A. The Ionization Mechanism for Gas in the Nuclei of NGC 1052 and NGC 4278. James A. Rose and Michael J. Tripicco. **285**, 55,

- 110-E9 (1984)
Spatially Resolved High-Velocity Outflow from the Nucleus of M51. *Gerald Cecil and James A. Rose*. **287**, 131, 134-D2 (1984)
- ROSE, WILLIAM K. The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. *William K. Rose, John Guillory, James H. Beall, and Selig Kainer*. **280**, 550, 55-G8 (1984)
- CO Line Emission from the Expanding Circumstellar Envelopes of Red Giants. *William K. Rose*. **285**, 237, 112-E2 (1984)
- ROSEN, W. A. A Study of Solar Photospheric Limb-Darkening Variations. *L. D. Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce*. **283**, 426, 90-F4 (1984)
- RÖSER, H.-J. On the Rapid Optical Variability of PKS 0129 - 164. *K. Meisenheimer and H.-J. Röser*. **279**, L39, 48-A7 (1984)
- RÖSER, HERMANN-JOSEF. Improved Lower Limits on Lyman-Alpha Forest Cloud Dimensions and Additional Evidence Supporting the Gravitational Lens Nature of 2345 + 007A. *B. Craig B. Foltz, Ray J. Weymann, Hermann-Josef Röser, and Frederic H. Chaffee, Jr.* **281**, L1, 65-E2 (1984)
- ROSMAN, K. J. R. *p*-Process Nucleosynthesis and the Abundances of the Minor Isotopes of Tin. *J. R. De Laeter, K. J. R. Rosman, and R. D. Loss*. **279**, 814, 46-F4 (1984)
- ROSNER, R. Magnetic Field Instabilities in Accretion Disks. *L. Stella and R. Rosner*. **277**, 312, 14-C11 (1984)
- A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos*. **277**, L35, 22-E1 (1984)
- On the Topological Stability of Magnetostatic Equilibria. *K. C. Tsinganos, J. Distler, and R. Rosner*. **278**, 409, 28-D4 (1984)
- Einstein Observations of X-Ray Emission from A Stars: Erratum. *L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr.* **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- The Overshoot Region at the Bottom of the Solar Convection Zone. *J. H. M. M. Schmitt, R. Rosner, and H. U. Bohn*. **282**, 316, 77-C9 (1984)
- ROSNER, ROBERT. The Appearance of Magnetic Flux on the Surfaces of the Early Main-Sequence F Stars. *Mark S. Giampapa and Robert Rosner*. **286**, L19, 126-E7 (1984)
- ROSS, R. R. Models of the Hard X-Ray Spectrum of AM Herculis and Implications for the Accretion Rate. *J. H. Swank, A. C. Fabian, and R. R. Ross*. **280**, 734, 57-G3 (1984)
- ROTHENFLUG, R. Temperature and Elemental Abundances in the Abell Cluster A576 Derived from X-Ray Observations. *R. Rothenflug, L. Vigroux, R. F. Mushotzky, and S. S. Holt*. **279**, 53, 37-E6 (1984)
- ROTHSCHILD, R. E. Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. *W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini*. **279**, 555, 44-A1 (1984)
- SMC X-1 Variability Observed from HEAO 1. *D. E. Gruber and R. E. Rothschild*. **283**, 546, 92-G1 (1984)
- The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson*. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- ROUSSEL-DUPRÉ, DIANE. Spectroscopic Studies of Wolf-Rayet Stars with Absorption Lines. VIII. HD 193793. *Peter S. Conti, Diane Roussel-Dupré, Philip Massey, and Michael Rensung*. **282**, 693, 82-E11 (1984)
- ROUSSEL-DUPRÉ, ROBERT. HRTS II EUV Observations of a Solar Ephemeral Region. *Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner*. **278**, 428, 28-E9 (1984)
- ROUSSEL-DUPRÉ, ROBERT A. The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. *Joseph E. Borovsky, Morris B. Pongratz, Robert A. Roussel-Dupré, and Tai-Ho Tan*. **280**, 802, 58-E10 (1984)
- ROWAN-ROBINSON, M. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. *M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker*. **278**, L7, 29-C9 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius*. **278**, L19, 29-D8 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. *C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young*. **278**, L45, 29-F3 (1984)
- IRAS Images of the Galactic Center. *T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden*. **278**, L57, 29-G4 (1984)
- Infrared Emission from M31. *H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer*. **278**, L59, 30-A1 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. *J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker*. **278**, L63, 30-A7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. *T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond*. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. *B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young*. **278**, L71, 30-C5 (1984)
1. Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). *E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier*. **278**, L75, 30-C9 (1984)
- A 25 Micron Component in 3C 390.3. *G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young*. **278**, L79, 30-C14 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. *G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson*. **278**, L83, 30-D2 (1984)
- On the Correlation of CO Line and Radio Continuum Emission in Nearby Galaxies and the Efficiency of OB Star Formation. *F. P. Israel and M. Rowan-Robinson*. **283**, 81, 87-A2 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. *B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson*. **283**, L1, 91-E3 (1984)
- ROY, JEAN-RENÉ. Kinematics and Dynamics of the H II Region Sharpless 142. I. The Velocity Field of the Ionized Hydrogen. *Gilles Joncas and Jean-René Roy*. **283**, 640, 94-A1 (1984)
- ROY CHOUDHURY, S. On the Kelvin-Helmholtz Instabilities of Supersonic Shear Layers. *S. Roy Choudhury and R. V. E. Lovelace*. **283**, 331, 89-E11 (1984)
- RUBIN, ROBERT H. Models of Four Highly Obscured Compact H II Regions. *J. P. Simpson and Robert H. Rubin*. **281**, 184, 63-A1 (1984)
- Line Emission from H II Blister Models. *Robert H. Rubin*. **287**, 653, 141-D8 (1984)
- RUBIN, VERA C. Luminosity-dependent Line Ratios in Disks of Spiral Galaxies. *Vera C. Rubin, W. Kent Ford, Jr., and Bradley C. Whitmore*. **281**, L21, 65-F6 (1984)
- Stellar and Gas Kinematics in Disk Galaxies. *Bradley C. Whitmore, Vera C. Rubin, and W. Kent Ford, Jr.* **287**, 66, 133-F3 (1984)
- RUDER, H. Comment on "Scaling Laws for Hydrogen-like Atoms in Magnetic Fields of Arbitrary Strength". *H. Herold, H. Ruder, and G. Wunner*. **285**, 870, 121-A1 (1984)
- RUDNICK, L. Alternating-Side Ejection in Extragalactic Radio Sources. *L. Rudnick and B. K. Edgar*. **279**, 74, 37-G2 (1984)
- RUDY, R. J. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock*. **278**, 521, 31-E14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sisko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason*. **284**, 512, 104-F8 (1984)
- RUDY, RICHARD J. The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga*. **278**, 530, 31-F9 (1984)
- The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert

- Galaxy NGC 7469. *Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner.* **280**, 521, 55-E6 (1984)
- He I $\lambda 10830$ Emission in Seyfert Galaxies and QSOs. *P. D. LeVan, R. C. Puetter, Harding E. Smith, and Richard J. Rudy.* **284**, 23, 98-B14 (1984)
- Effects of Dust on the Infrared Emission, Selected Line Ratios, and Polarization of Seyfert 1 Galaxies, Broad-Line Radio Galaxies, and Quasars. *Richard J. Rudy.* **284**, 33, 98-C10 (1984)
- Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga.* **284**, 523, 104-G5 (1984)
- Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. *Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke.* **284**, L5, 103-A6 (1984)
- RUIS, ANTONIO. A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. *Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Ruis.* **284**, 519, 104-G1 (1984)
- RUIZ, MARIA TERESA. Time Variations of the H α Line Profile from the Core of Eta Carinae. *Maria Teresa Ruiz, Jorge Melnick, and Patricio Ortiz.* **285**, L19, 114-G5 (1984)
- RUSSELL, R. W. Ionized Magnesium in the Planetary Nebula NGC 7027. *S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant.* **277**, 207, 13-B13 (1984)
- RYAN, WILLIAM. Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. *Arthur N. Cox, Bernard J. McNamara, and William Ryan.* **284**, 250, 100-F13 (1984)
- RYBICKI, G. X-Ray Measurements of the Nonspherical Mass Distribution in the Cluster of Galaxies A2256. *D. Fabricant, G. Rybicki, and P. Gorenstein.* **286**, 186, 124-A6 (1984)
- RYBICKI, G. B. Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. II. Implementation of the Method. *P. G. Martin, C. Rogers, and G. B. Rybicki.* **284**, 317, 101-D10 (1984)
- Instabilities in Line-driven Stellar Winds. I. Dependence on Perturbation Wavelength. *S. P. Owocki and G. B. Rybicki.* **284**, 337, 101-F2 (1984)
- RYDEN, BARBARA S. A Statistical Comparison of Voids in the Galaxy Distribution of n -Body Simulations. *Barbara S. Ryden and Edwin L. Turner.* **287**, L59, 145-C9 (1984)
- RYDGRÉN, A. E. The Ratio of Total to Selective Extinction in the Chamaeleon TI and R Coronae Australis Dark Clouds. *F. J. Vrba and A. E. Rydgrén.* **283**, 123, 87-D2 (1984)
- SACHER, W. The Bremsstrahlung Component of the Diffuse Galactic Gamma-Ray Emission at MeV Energies. *W. Sacher and V. Schönfelder.* **279**, 817, 46-F7 (1984)
- SADLER, E. M. A Complete Sample of Southern E and S0 Galaxies: Clustering Properties. *E. M. Sadler and N. A. Sharp.* **287**, 80, 133-G6 (1984)
- SADUN, ALBERTO. Relativistic Jet Meets Target: The Gamma-Rays from 3C 273. *Philip Morrison, Dana Roberts, and Alberto Sadun.* **280**, 483, 55-B9 (1984)
- SAHA, A. A Search for Distant Halo RR Lyrae Stars. *A. Saha.* **283**, 580, 93-B11 (1984)
- Spectroscopy and Spectrophotometry of Distant Halo RR Lyrae Stars. *A. Saha and J. B. Oke.* **285**, 688, 119-A9 (1984)
- SAHADE, JORGE. Comments on the Ultraviolet Spectrum of γ^2 Velorum. *Jorge Sahaide, Yoji Kondo, and George E. McCluskey, Jr.* **276**, 281, 3-G11 (1984)
- SAHAI, R. SIS in Circumstellar Shells. *R. Sahai, Alwyn Wootten, and R. E. S. Clegg.* **284**, 144, 99-F2 (1984)
- SAIO, HIDEYUKI. Very Nonadiabatic Radial Pulsations in Luminous Helium Stars. *Hideyuki Saio, J. Craig Wheeler, and John P. Cox.* **281**, 318, 64-D4 (1984)
- SAITO, S. Detection of U45379: An Intense, Peculiar Unidentified Line. *H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito.* **282**, 197, 76-B1 (1984)
- SAITO, SHUJI. Laboratory Millimeter-Wave Spectrum of Iron Monoxide, FeO. *Yasuki Endo, Shuji Saito, and Eizi Hirota.* **278**, L131, 36-D13 (1984)
- SAKATA, AKIRA. Infrared Spectrum of the Laboratory-Synthesized Quenched Carbonaceous Composite (QCC): Comparison with the Infrared Unidentified Emission Bands. *Akira Sakata, Setsuko Wada, Toshihiko Tanabe, and Takashi Onaka.* **287**, L51, 138-F9 (1984)
- SAKELLARIADOU, M. Physical Processes in the Universe at the Epoch of the Quark-Hadron Transition. *S. A. Bonometto and M. Sakellariadou.* **282**, 372, 79-A14 (1984)
- SAKURAI, TAKASHI. Generation of Coronal Electric Currents Due to Convective Motions on the Photosphere. II. Resonance and Phase-Mixing of Alfvén Waves. *Takashi Sakurai and Aleck Granik.* **277**, 404, 15-C8 (1984)
- SALINAS, F. On the Excitation of CH Microwave Lines. *V. Bujarrabal, I. Gonzalo, and F. Salinas.* **285**, 312, 113-C10 (1984)
- SALPETER, E. E. 1.4 GHz Continuum Sources in the Hercules Cluster. *J. M. Dickey and E. E. Salpeter.* **284**, 461, 104-B13 (1984)
- H I Observations in the Virgo Cluster Area. II. A Complete, Magnitude-Limited Sample of Spiral Galaxies. *George Helou, G. Lyle Hoffman, and E. E. Salpeter.* **55**, 433, 17-A1 (1984) (Abstr. in **281**, 890, 72-C3)
- SALVADOR-SOLÉ, E. Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. *G. Des Forêts, R. Dominguez-Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solé.* **280**, 15, 49-B9 (1984)
- SALVATI, M. The Evolution of Nonthermal Supernova Remnants. II. Can Radio Supernovae Become Perions? *R. Bandiera, F. Pacini, and M. Salvati.* **285**, 134, 111-D6 (1984)
- SAMORSKI, M. Search for Discrete Gamma-Ray Sources Emitting at Energies Greater than 10^{15} eV. *M. Samorski and W. Stamm.* **277**, 897, 21-G9 (1984)
- SAMPSON, DOUGLAS H. Inner Shell Excitation of Lithium-like Ions. *Stephen J. Goett, Douglas H. Sampson, and Robert E. H. Clark.* **54**, 115, 2-E2 (1984) (Abstr. in **275**, 928, 147-F1)
- SAMUELSON, ROBERT. Hydrogen Dimer Structures in the Far-Infrared Spectra of Jupiter and Saturn. *Lothar Frommhold, Robert Samuelson, and George Birnbaum.* **283**, L79, 97-D14 (1984)
- SANDAGE, ALLAN. The Effect of the Perturbation of the Local Velocity Field by Virgo on the Calculation of Differential Luminosity Functions. *R. G. Kraan-Korteweg, Allan Sandage, and G. A. Tammann.* **283**, 24, 86-C7 (1984)
- SANDERS, D. Star Formation in the M8E Region. *M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders.* **278**, 170, 25-G8 (1984)
- SANDERS, D. B. Giant Molecular Clouds in the Galaxy. I. The Axisymmetric Distribution of H $_2$. *D. B. Sanders, P. M. Solomon, and N. Z. Scofield.* **276**, 182, 2-G7 (1984)
- The Distribution of CO in the Galaxy for Longitudes 294° to 86° . *B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scofield, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon.* **283**, L31, 97-A8 (1984)
- High-Velocity Molecular Jets. *Ronald L. Snell, N. Z. Scofield, D. B. Sanders, and Neal R. Erickson.* **284**, 176, 100-A8 (1984)
- SANDERS, R. H. Gravitational Imaging by Superclusters. *R. H. Sanders, T. S. van Albada, and T. A. Oosterloo.* **278**, L91, 36-A8 (1984)
- SANDERS, W. T. Limits on Diffuse X-Ray Emission from M101. *D. McCammon and W. T. Sanders.* **287**, 167, 134-F13 (1984)
- Limits on Soft X-Ray Flux from Distant Emission Regions. *D. N. Burrows, D. McCammon, W. T. Sanders, and W. L. Kraushaar.* **287**, 208, 135-B13 (1984)
- SANDFORD, MAXWELL T., II. Radiatively Driven Dust-bounded Implosion: Formation and Stability of Dense Globules. *Maxwell T. Sandford II, Rodney W. Whitaker, and Richard I. Klein.* **282**, 178, 75-G10 (1984)
- SANDQVIST, AA. High-Velocity HCO $^+$ in Cepheus A: Ionization Levels in High-Density Clumps within a Molecular Flow. *Robert B. Loren, Alwyn Wootten, Aa. Sandqvist, P. Friberg, and Å. Hjalmarson.* **287**, 707, 142-A11 (1984)
- SANDQVIST, AAGE. The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO $^+$ Flow in NGC 2071. *Alwyn Wootten, Robert B. Loren, Aage Sandqvist, Per Friberg, and Åke Hjalmarson.* **279**, 633, 44-F14 (1984)
- SANDULEAK, N. The Early-Type Strong Emission-Line Supergiants of the Magellanic Clouds: A Spectroscopic Zoology. *Steven N. Shore and N. Sanduleak.* **55**, 1, 11-A2 (1984) (Abstr. in **279**, 909, 47-F14)
- The Case Low-Dispersion Northern Sky Survey. II. *N. Sanduleak and Peter Pesch.* **55**, 517, 17-F13 (1984) (Abstr. in **281**, 892, 72-C5)
- SANROMA, M. VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. *W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanroma, and A. Rius.* **286**, 503, 128-E13 (1984)
- SANTANGELO, P. N-Body Simulations of Small Groups of Galaxies. *G. Giuricin, F. Mardirossian, M. Mezzetti, and P. Santangelo.* **277**, 38, 11-D1 (1984)
- SANTANGELO, PAOLO. Phase-Space Correlation Functions and Isolating Integrals. *Paolo Carnevali and Paolo Santangelo.* **281**, 473, 65-B2 (1984)
- SANZ, J. L. Some Observable Effects in Relativistic Cosmology with Non-Perfect Fluids. *L. J. Goicoechea and J. L. Sanz.* **286**, 392, 127-C14 (1984)
- SARAZIN, C. L. A New Similarity Solution for Reverse Shocks in Supernova Remnants. *A. J. S. Hamilton and C. L. Sarazin.* **281**, 682, 70-A5 (1984)
- X-Ray Emission from Supernova Remnants. II. The Effect of Remnant Structure on Nonequilibrium X-Ray Spectra. *A. J. S. Hamilton and C. L. Sarazin.* **284**, 601, 105-F2 (1984)
- Heating and Cooling in Reverse Shocks into Pure Heavy-Element

- Supernova Ejecta. *A. J. S. Hamilton and C. L. Sarazin*. **287**, 282, 136-A10 (1984)
- SARCANDER, MICHAEL. The Kinematics of the Crab Nebula's Jet. *Peter Shull, Jr., Uri Carsenty, Michael Sarcander, and Thorsten Neckel*. **285**, L75, 121-F9 (1984)
- SARGENT, A. I. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. *C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. *M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **285**, L79, 121-G2 (1984)
- SASLAW, WILLIAM C. Thermodynamics and Galaxy Clustering: Nonlinear Theory of High Order Correlations. *William C. Saslaw and Andrew J. S. Hamilton*. **276**, 13, 1-B4 (1984)
- SASTRY, K. V. L. N. Laboratory Millimeter and Submillimeter Spectra of HNO and DNO. *K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia*. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- SATO, N. Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **280**, 259, 51-G6 (1984)
- SAULS, J. A. Rapid Postglitch Spin-up of the Superfluid Core in Pulsars. *M. A. Alpar, Stephen A. Langer, and J. A. Sauls*. **282**, 533, 81-A1 (1984)
- SAUVAL, A. J. The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. *A. J. Sauval, N. Grevesse, J. W. Brault, G. M. Stoakes, and R. Zander*. **282**, 330, 77-D9 (1984)
- A Set of Partition Functions and Equilibrium Constants for 300 Diatomic Molecules of Astrophysical Interest. *A. J. Sauval and J. B. Tatum*. **56**, 193, 25-A2 (1984) (Abstr. in **284**, 869, 108-E1)
- SAVAGE, ANN. Redshifts of Southern Radio Sources. VI. *David L. Jauncey, Michael J. Batt, Alan E. Wright, Bruce A. Peterson, and Ann Savage*. **286**, 498, 128-E8 (1984)
- SAVAGE, BLAIR D. Ultraviolet Observations of Interstellar Extinction near the Cepheus OB3 Molecular Cloud. *Derek Massa and Blair D. Savage*. **279**, 310, 40-D5 (1984)
- International Ultraviolet Explorer Observations of Stars in 30 Doradus: Extinction and Stellar Continua. *Edward L. Fitzpatrick and Blair D. Savage*. **279**, 578, 44-B10 (1984)
- Main-Sequence B Stars with Strong Winds in the Core of NGC 6231. *Derek Massa, Blair D. Savage, and Joseph P. Cassinelli*. **287**, 814, 143-B9 (1984)
- SAVEDOFF, M. P. Electromagnetic Damping of Neutron Star Oscillations. *P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen*. **281**, 746, 70-F2 (1984)
- On the Bizarre Gamma-Ray Spectrum of SS 433. *H. L. Helfer and M. P. Savedoff*. **283**, L49, 97-B12 (1984)
- SAWAMURA, MINEO. Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). *Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi*. **280**, 213, 51-D1 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130–200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. *Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira*. **287**, 359, 136-G7 (1984)
- SAWYER, SCOTT R. Lithium in Late-Type Giants. III. The Weak G Band Giants. *David L. Lambert and Scott R. Sawyer*. **283**, 192, 88-B6 (1984)
- SAYKALLY, R. J. A Search for Interstellar Silicon Nitride. *L. M. Ziurys, D. P. Clemens, R. J. Saykally, M. Colvin, and H. F. Schaefer*. **281**, 219, 63-C9 (1984)
- SCALO, JOHN M. Continuum Models for Gas in Disturbed Galaxies. I. Model Equations. *John M. Scalo and Curtis Struck-Marcell*. **276**, 60, 1-E9 (1984)
- Continuum Models for Gas in Disturbed Galaxies. II. Stability of Simplified Model Systems. *Curtis Struck-Marcell and John M. Scalo*. **277**, 132, 12-D3 (1984)
- Turbulent Velocity Structure in Interstellar Clouds. *John M. Scalo*. **277**, 556, 18-B6 (1984)
- SCHADE, D. J. Optical Counterparts for X-Ray Sources in M31. *D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck*. **284**, 663, 106-C8 (1984)
- SCHAEFER, B. 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Znenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch*. **286**, L5, 126-D7 (1984)
- SCHAEFER, B. E. Three Precise Gamma-Ray Burst Source Locations. *T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Znenchenko, V. G. Kurt, and B. E. Schaefer*. **286**, L15, 126-F3 (1984)
- SCHAEFER, BRADLEY E. An Intercontinental Baseline Coincidence Search for Optical Flashes with Two Schmidt Telescopes. *Bradley E. Schaefer, Roland Vanderspek, Hale V. Bradt, and George R. Ricker*. **283**, 887, 96-E8 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- SCHAEFER, H. F. A Search for Interstellar Silicon Nitride. *L. M. Ziurys, D. P. Clemens, R. J. Saykally, M. Colvin, and H. F. Schaefer*. **281**, 219, 63-C9 (1984)
- SCHAEFFER, RICHARD. Massive Neutrinos and the Pancake Theory of Galaxy Formation. *Richard Schaeffer and Joseph Silk*. **281**, L13, 65-E14 (1984)
- SCHARLACH, WERNER W. G. Time Series Infrared Spectroscopy of Mira Variables. II. CO $\delta_v = 3$ in Eight Mira Variables and One SRA Variable. *Kenneth H. Hinkle, Werner W. G. Scharlach, and Donald N. B. Hall*. **56**, 1, 22-A2 (1984) (Abstr. in **283**, 905, 96-F12)
- SCHATTEN, KENNETH H. A Conjecture concerning Thermodynamic Limits to Solar Atmospheric Heating. *Kenneth H. Schatten and Hans G. Mayr*. **283**, 853, 96-C2 (1984)
- SCHECHESTER, PAUL. Detection of Binaries with Projected Separations as Large as 0.1 Parsec. *David W. Latham, John Tonry, John N. Bahcall, Raymond M. Soneira, and Paul Schechter*. **281**, L41, 66-G10 (1984)
- SCHECHESTER, PAUL L. NGC 4650A: The Rotation of the Diffuse Stellar Component. *Paul L. Schechter, Marie-Helene Ulrich, and A. Boksenberg*. **277**, 526, 17-G3 (1984)
- SCHIEPMAKER, A. The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. *A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson*. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- SCHIED, JOHN A. Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. *Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips*. **279**, 184, 39-A8 (1984)
- SCHEMPF, W. V. A Search for Interstellar H₂O⁺ in Diffuse Clouds. *Wm. Hayden Smith, W. V. Schempp, and S. R. Federman*. **277**, 196, 13-B2 (1984)
- SCHERB, F. Hydrogen Production Rate from Comet Austin 1982g. *P. Shih, F. Scherb, and F. L. Roesler*. **279**, 453, 42-A1 (1984)
- SCHILD, R. IE 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. *J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccacaro*. **277**, 43, 11-D6 (1984)
- CCD Observations of Galaxies in Clusters at High Redshift. *R. Schild*. **286**, 450, 128-A6 (1984)
- SCHILD, R. E. CPD – 48°1577: The Brightest Known Cataclysmic Variable. *R. F. Garrison, R. E. Schild, W. A. Hiltner, and W. Krzeminski*. **276**, L13, 5-E13 (1984)
- CCD Brightness Monitoring of the Twin QSO 0957 + 561. *R. E. Schild and T. Weekes*. **277**, 481, 17-C13 (1984)
- SCHILD, RUDOLPH E. Photometric Study of NGC 2023 in the 3500 Å to 10000 Å Region: Confirmation of a Near-IR Emission Process in Reflection Nebulae. *Adolf N. Witt, Rudolph E. Schild, and James B. Kraiman*. **281**, 708, 70-C3 (1984)
- SCHILD, RUDY E. The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N–Log S. *Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub*. **283**, 495, 92-C1 (1984)
- SCHINDLER, K. MHD Stability of Sheet Equilibria Relevant for Quiescent Prominences. *J. Galindo-Trejo and K. Schindler*. **277**, 422, 15-D12 (1984)
- SCHLEGEL, ERIC M. A Spectroscopic Study and Mass Determination for the Cataclysmic Variable AC Cancri. *Eric M. Schlegel, Ronald H. Kaitchuck, and R. Kent Honeycutt*. **280**, 235, 51-E10 (1984)
- SCHLICKSEISER, R. Is Quasar QS 0630 + 180 Found in the Gamma-Ray Error Box of CG 195 + 4 a Proton Quasar? *R. Schlickeiser*. **277**, 485,

- 17-D3 (1984)
- SCHLOERB, F. PETER. Cyanide and Isocyanide Abundances in the Cold, Dark Cloud TMC-1. *William M. Irvine and F. Peter Schloerb*. **282**, 516, 80-F12 (1984)
- Large-Scale Structure of Molecular Gas in Heiles Cloud 2: A Remarkable Rotating Ring. *F. Peter Schloerb and Ronald L. Snell*. **283**, 129, 87-D8 (1984)
- CO Emission from IRAS Galaxies. *Judith S. Young, Jeffrey Kenney, Steven D. Lord, and F. Peter Schloerb*. **287**, L65, 145-C14 (1984)
- SCHLOSMA, ISAAC. On the Origin of Power-Law X-Ray Spectra of AGNs. *Isaac Schlosman, Jacob Shaham, and Giora Shaviv*. **287**, 534, 140-A7 (1984)
- SCHMIDT, EDWARD G. The Chromospheres of Classical Cepheids. II. High-Resolution Profiles of the Mg II h and k Lines. *Edward G. Schmidt and Sidney B. Parsons*. **279**, 202, 39-C1 (1984)
- The Chromospheres of Classical Cepheids. III. A Search for Transition Region Emission Lines. *Edward G. Schmidt and Sidney B. Parsons*. **279**, 215, 39-D2 (1984)
- The Luminosity Scale of Cepheid Variable Stars: A Revision. *Edward G. Schmidt*. **285**, 501, 117-A4 (1984)
- Yellow Giants in Young Clusters. II. A Comparison of Observation with Theory. *Edward G. Schmidt*. **287**, 261, 135-F11 (1984)
- Yellow Giants in Young Clusters. I. Photometric Observations. *Edward G. Schmidt*. **285**, 455, 17-B8 (1984) (Abstr. in **281**, 891, 72-C4)
- SCHMIDT, G. D. E2003 + 225: A $3^{\circ}42'$ AM Hercules Type Binary System. *J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal*. **277**, 682, 19-E7 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga*. **278**, 530, 31-F9 (1984)
- SCHMIDT, GARY D. Wavelength-Dependent Polarization in the Optical Flux of the BL Lacertae Object B2 1308 + 326. *Michael L. Sittko, Wayne A. Stein, and Gary D. Schmidt*. **282**, 29, 74-C6 (1984)
- SCHMIDT, MAARTEN. IUE Observations of High-Redshift Quasars. *Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman*. **281**, 76, 61-F12 (1984)
- SCHMIDTKE, PAUL C. The 1982 Eclipse of 31 Cygni. *Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman*. **281**, 751, 70-F7 (1984)
- SCHMITT, J. H. M. M. The Overshoot Region at the Bottom of the Solar Convection Zone. *J. H. M. M. Schmitt, R. Rosner, and H. U. Bohn*. **282**, 316, 77-C9 (1984)
- SCHMITZ, F. Apparent Solar Temperature Enhancement due to Large-Amplitude Waves. *W. Kalkofen, P. Ulmschneider, and F. Schmitz*. **287**, 952, 144-E11 (1984)
- SCHNEEBERGER, TIMOTHY J. The Response of Chromospheric Emission Lines to Flares on YZ Canis Minoris. *Simon P. Worden, Timothy J. Schneebberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram*. **276**, 270, 3-F14 (1984)
- SCHOLER, M. Analysis of Solar Flare Gamma-Ray Events. *C. Kouveliotou, R. A. Treumann, and M. Scholer*. **278**, 420, 28-E1 (1984)
- Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. *B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk*. **281**, 458, 66-A1 (1984)
- Ionic Charge State Measurements during He^{+} -rich Solar Particle Events. *D. Hovestadt, G. Gloeckler, B. Klecker, and M. Scholer*. **281**, 463, 66-A6 (1984)
- Survey of $\text{He}^{+}/\text{He}^{2+}$ Abundance Ratios in Energetic Particle Events. *D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer*. **282**, L39, 78-C12 (1984)
- SCHOMMER, BOB. The Distances and Properties of a Sample of Sc I Galaxies. *Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould*. **278**, 475, 31-B9 (1984)
- SCHOMMER, R. A. Mass-to-Light Ratios for Binary Pairs of Dwarf Irregular Galaxies. *George Lake and R. A. Schommer*. **279**, L19, 42-E5 (1984)
- A Successful Survey of H I in Low-Luminosity Elliptical Galaxies. *George Lake and R. A. Schommer*. **280**, 107, 50-B12 (1984)
- Imaging Spectrophotometric Observations of the Ionized Hydrogen Associated with M82. *T. B. Williams, Nelson Caldwell, and R. A. Schommer*. **281**, 579, 68-G7 (1984)
- SCHOMMER, ROBERT A. AM-1: A Very Distant Globular Cluster. *Marc Aaronson, Robert A. Schommer, and Edward W. Olszewski*. **276**, 221, 3-C5 (1984)
- The Population Structure of the Large Magellanic Cloud Bar. *Eduardo Hardy, Roberto Buonomano, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer*. **278**, 592, 32-D3 (1984)
- A Distance to the Large Magellanic Cloud by Main-Sequence Fitting. *Robert A. Schommer, Edward W. Olszewski, and Marc Aaronson*. **285**, L53, 121-D11 (1984)
- SCHÖNBERNER, D. LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? *D. Schönberner and J. S. Drilling*. **276**, 229, 3-D1 (1984)
- Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. *J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray*. **278**, 224, 26-D8 (1984)
- Effective Temperatures and Luminosities of Very Hot O Type Subdwarfs. *D. Schönberner and J. S. Drilling*. **278**, 702, 33-E9 (1984)
- Broad-Band Photometry of Extreme Helium Stars. *J. S. Drilling, A. U. Landolt, and D. Schönberner*. **279**, 748, 46-A7 (1984)
- Far-Ultraviolet Spectrophotometry of Two Very Hot O Type Subdwarfs. *J. S. Drilling, J. B. Holberg, and D. Schönberner*. **283**, L67, 97-D3 (1984)
- SCHÖNFELDER, V. The Bremsstrahlung Component of the Diffuse Galactic Gamma-Ray Emission at MeV Energies. *W. Sacher and V. Schönfelder*. **279**, 817, 46-F7 (1984)
- SCHRAMM, D. N. Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. *J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive*. **281**, 493, 68-A5 (1984)
- SCHULMAN, LAWRENCE S. A Galactic Disk is Not a True Exponential. *Philip E. Seiden, Lawrence S. Schulman, and Bruce G. Elmegreen*. **282**, 95, 75-A7 (1984)
- SCHWARTZ, D. A. Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. *J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock*. **280**, 688, 57-C14 (1984)
- SCHWARTZ, P. R. NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein*. **280**, 154, 50-F5 (1984)
- The T Tauri Radio Source. *P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell*. **280**, L23, 54-D13 (1984)
- VLA Observations of T Tauri Stars. II. A Luminosity-limited Survey of Taurus-Auriga. *J. H. Bieging, Martin Cohen, and P. R. Schwartz*. **282**, 699, 82-F4 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper*. **284**, 597, 105-E12 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. *Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum*. **286**, 302, 125-C1 (1984)
- SCHWARTZ, R. A. Solar Hard X-Ray Microflares. *R. P. Lin, R. A. Schwartz, S. R. Kane, R. M. Pelling, and K. C. Hurley*. **283**, 421, 90-E13 (1984)
- SCHWARTZ, RICHARD D. Far-Infrared Studies of Herbig-Haro Objects and Their Exciting Stars. *Martin Cohen, Paul M. Harvey, Richard D. Schwartz, and Bruce A. Wilking*. **278**, 671, 33-C6 (1984)
- Far-Infrared Observations of Southern Herbig-Haro Objects. *Martin Cohen, Richard D. Schwartz, Paul M. Harvey, and Bruce A. Wilking*. **281**, 250, 63-E12 (1984)
- The 1984 Supernova in NGC 3169: Evidence for a Superwind. *Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz*. **287**, L69, 145-D7 (1984)
- SCHWARZSCHILD, M. Stellar Orbits in Angle Variables. *Stephen J. Ratcliff, Kar Man Chang, and M. Schwarzschild*. **279**, 610, 44-D14 (1984)
- SCHWIEZER, MARTIN A. Opacities for Comptonization Plus Emission and Absorption. *Martin A. Schwiezer*. **280**, 809, 58-F3 (1984)
- SCIORTINO, S. Far-Infrared and CO Observations of the W33 Complex. *M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino*. **283**, 573, 93-B4 (1984)
- SCOTT, EUGENE HOWARD. Ambipolar Diffusion in Equilibrium Self-gravitating Gaseous Configurations. I. Plane-parallel Slabs. *Eugene Howard Scott*. **278**, 396, 28-C5 (1984)
- SCOTT, JOHN S. The Scattering of Energetic Particles by Waves in a Finite β Plasma. *Joseph M. Davila and John S. Scott*. **280**, 334, 52-E12 (1984)
- The Interplanetary Scattering Mean Free Path: Collisionless Wave-damping Effects. *Joseph M. Davila and John S. Scott*. **285**, 400, 114-C5 (1984)
- SCOTT, S. L. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **282**, L59,

- 85-B4 (1984)
Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- SCOVILLE, N. Z. Giant Molecular Clouds in the Galaxy. I. The Axisymmetric Distribution of H₂. D. B. Sanders, P. M. Solomon, and N. Z. Scoville. **276**, 182, 2-G7 (1984)
The Distribution of CO in the Galaxy for Longitudes 294° to 86°. B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon. **283**, L31, 97-A8 (1984)
High-Velocity Molecular Jets. Ronald L. Snell, N. Z. Scoville, D. B. Sanders, and Neal R. Erickson. **284**, 176, 100-A8 (1984)
Molecular Clouds in M82. Judith S. Young and N. Z. Scoville. **287**, 153, 134-E12 (1984)
- SCRIMGER, J. NORMAN. Helium I λ 10830 Line Strengths in Planetary Nebulae. J. Norman Scrimger. **280**, 170, 50-G7 (1984)
- SEAB, C. GREGORY. Ultraviolet Extinction and Diffuse Band Strength Correlations. C. Gregory Seab and Theodore P. Snow, Jr. **277**, 200, 13-B6 (1984)
- SEAGRAVES, P. The Sun as a Star: 1982 June 14–August 13. R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime. **280**, 873, 59-C11 (1984)
- SEAQUIST, E. R. A Radio Survey of Symbiotic Stars. E. R. Seaquist, A. R. Taylor, and S. Button. **284**, 202, 100-C7 (1984)
Radio Emission from Symbiotic Stars: A Binary Model. A. R. Taylor and E. R. Seaquist. **286**, 263, 124-F14 (1984)
- SEARLE, L. The Clusters of M33. J. G. Cohen, S. E. Persson, and L. Searle. **281**, 141, 62-D10 (1984)
- SEARS, TREVOR J. Infrared and Far-Infrared Transition Frequencies for the CH₂ Radical. Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown. **276**, 399, 5-B7 (1984)
- SEELY, J. F. Direct Measurement of the Increase in Altitude of the Soft X-Ray Emission Region during a Solar Flare. J. F. Seely and U. Feldman. **280**, L59, 60-E10 (1984)
- SEGGEWISS, WILHELM. A Long-Period Orbit for the Binary Wolf-Rayet Star HD 193793, WC7 + O4-5. Robert Lamontagne, Anthony F. J. Moffat, and Wilhelm Seggewiss. **277**, 258, 13-F10 (1984)
- SEIDEN, PHILIP E. A Galactic Disk is Not a True Exponential. Philip E. Seiden, Lawrence S. Schulman, and Bruce G. Elmegreen. **282**, 95, 75-A7 (1984)
- SEKI, MIDORI. Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama. **279**, 413, 41-D10 (1984)
Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections to the Liquid Metal Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **280**, 787, 58-D9 (1984)
Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **285**, 304, 113-C2 (1984)
Electrical and Thermal Conductivities of Dense Matter in the Crystalline Lattice Phase. Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki. **285**, 758, 119-F12 (1984)
- SELLGREN, K. The Near-Infrared Continuum Emission of Visual Reflection Nebulae. K. Sellgren. **277**, 623, 18-G4 (1984)
- SELLWOOD, J. A. Spiral Instabilities Provoked by Accretion and Star Formation. J. A. Sellwood and R. G. Carlberg. **282**, 61, 74-E12 (1984)
- SERIO, S. Far-Infrared and CO Observations of the W33 Complex. M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino. **283**, 573, 93-B4 (1984)
- SERNYAK, MICHAEL F., JR. Structure of the L1535 Dark Cloud and the Velocity Field in the Taurus Molecular Complex. Paul F. Goldsmith and Michael F. Sernyak, Jr. **283**, 140, 87-E7 (1984)
- SEWARD, F. The Central X-Ray Source in SS 433. J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall. **277**, 286, 14-A13 (1984)
- SEWARD, F. D. X-Rays from the SNR 3C 391. Z. R. Wang and F. D. Seward. **279**, 705, 45-E4 (1984)
The X-Ray Nebula around PSR 1509–58. F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank. **281**, 650, 69-E14 (1984)
X-Rays from Eta Carinae. T. Chlebowski, F. D. Seward, J. Swank, and A. Szymkowiak. **281**, 665, 69-G1 (1984)
Einstein Observations of the Crab Nebula Pulsar. F. R. Harnden, Jr. and F. D. Seward. **283**, 279, 89-A12 (1984)
- An X-Ray Investigation of the Unusual Supernova Remnant CTB 80. Z. R. Wang and F. D. Seward. **285**, 607, 118-B10 (1984)
Discovery of a 50 Millisecond Pulsar in the Large Magellanic Cloud. F. D. Seward, F. R. Harnden, Jr., and David J. Helfand. **287**, L19, 138-D5 (1984)
- SEWARD, FREDERICK D. High-Resolution Soft X-Ray Spectra of Scorpius X-1: The Structure of Circumscribed Accreting Material. Steven M. Kahn, Frederick D. Seward, and Tomasz Chlebowski. **283**, 286, 89-B7 (1984)
- SHAFFER, R. A. Luminosity Enhancement in Relativistic Jets and Altered Luminosity Functions for Beamed Objects. C. M. Urry and R. A. Shafer. **280**, 569, 55-A14 (1984)
- SHAFFER, D. B. Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer. **276**, 480, 6-G3 (1984)
- SHAFFER, DAVID B. Very High Resolution Observations of Compact Sources in the Direction of Supernova Remnants: G74.87 + 1.22. Barry J. Geldzahler, David B. Shaffer, and Helmut Kühr. **286**, 284, 125-A9 (1984)
- SHAFTER, ALLEN W. Radial Velocity Studies of Cataclysmic Binaries. II. The Ultrashort Period Dwarf Nova T Leonis. Allen W. Shafter and Paula Szkody. **276**, 305, 4-B7 (1984)
- IR Geminorum: Indications of a Massive White Dwarf and a Heated Secondary in this New SU Ursae Majoris Cataclysmic Variable. Paula Szkody, Allen W. Shafter, and Anne P. Cowley. **282**, 236, 76-D12 (1984)
- SHAHAM, J. Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **276**, 325, 4-C13 (1984)
Vortex Creep and the Internal Temperature of Neutron Stars. II. Vela Pulsar. M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham. **278**, 791, 34-E5 (1984)
- SHAHAM, JACOB. Line Locking and SS 433. Miriam Pekarevich, Tsvi Piran, and Jacob Shaham. **283**, 295, 88-C3 (1984)
On the Origin of Power-Law X-Ray Spectra of AGNs. Isaac Schlosman, Jacob Shaham, and Giora Shaviv. **287**, 534, 140-A7 (1984)
- SHAPIRO, I. I. Testing the Strong Equivalence Principle by Radio Ranging. V. M. Canuto, I. Goldman, and I. I. Shapiro. **276**, 1, 1-A6 (1984)
VLBI Study of 1038 + 528 A and B: Discovery of Wavelength Dependence of Peak Brightness Location. J. M. Marcaide and I. I. Shapiro. **276**, 56, 1-E5 (1984)
The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth. **279**, 116, 38-C3 (1984)
Limits of Arcsecond-Scale Fluctuations in the Cosmic Microwave Background. J. E. Knake, R. B. Partridge, M. I. Ratner, and I. I. Shapiro. **284**, 479, 104-D3 (1984)
VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanromá, and A. Rius. **286**, 503, 128-E13 (1984)
The Milli-arcsecond Images of Q0957 + 561. M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney. **287**, 538, 140-A11 (1984)
- SHAPIRO, IRWIN I. The Compact Radio Source 2021 + 614: A Peculiar Narrow-Line Radio Galaxy. Norbert Bartel, Irwin I. Shapiro, John P. Huchra, and Helmut Kühr. **279**, 112, 38-B13 (1984)
A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Rius. **284**, 519, 104-G1 (1984)
- SHAPIRO, STUART L. Neutrino Emissivity of Interacting Quark Matter in Neutron Stars. II. Finite Neutrino Momentum Effects. Robert C. Duncan, Stuart L. Shapiro, and Ira Wasserman. **278**, 806, 34-F6 (1984)
Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. Rida Farouki, Stuart L. Shapiro, and Ira Wasserman. **284**, 282, 101-B3 (1984)
Gravitational Radiation from Colliding Compact Stars: Hydrodynamical Calculations in Two Dimensions. David L. Gilden and Stuart L. Shapiro. **287**, 728, 142-C5 (1984)
- SHARA, M. M. WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne. **282**, 763, 83-D4 (1984)
- SHARMA, R. R. Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. R. R. Sharma and Loukas Vlahos. **280**, 405, 53-D1 (1984)
- SHARP, N. A. Double Galaxy Redshifts and Dynamical Analyses. N. A. Sharp. **286**, 437, 127-G5 (1984)

- A Complete Sample of Southern E and S0 Galaxies: Clustering Properties. *E. M. Sadler and N. A. Sharp*. **287**, 80, 133-G6 (1984)
- SHAVIV, GHORA. Diffusion in a Thermally Pulsating Star. *Attay Kovets, Dina Pridnik, and Giora Shaviv*. **282**, 584, 81-D10 (1984)
- On the Origin of Power-Law X-Ray Spectra of AGNs. *Isaac Schlosman, Jacob Shaham, and Giora Shaviv*. **287**, 534, 140-A7 (1984)
- SHAW, RICHARD A. The O VI Nucleus of the Planetary Nebula M3-30. *James B. Kaler and Richard A. Shaw*. **278**, 195, 26-B6 (1984)
- SHAYA, EDWARD J. Supercluster-Supercluster Interactions. *Edward J. Shaya*. **280**, 470, 55-A10 (1984)
- Infall of Galaxies into the Virgo Cluster and Some Cosmological Constraints. *R. Brent Tully and Edward J. Shaya*. **281**, 31, 61-C8 (1984)
- The Angular Momentum Content of Galaxies. *Edward J. Shaya and R. Brent Tully*. **281**, 56, 61-E6 (1984)
- SHEELEY, N. R., JR. Associations between Coronal Mass Ejections and Metric Type II Bursts. *N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels*. **279**, 839, 47-A4 (1984)
- SHELTON, J. C. Solar Luminosity Fluctuations and Active Region Photometry. *G. A. Chapman, A. D. Herzog, J. K. Lawrence, and J. C. Shelton*. **282**, L99, 85-E2 (1984)
- SHERMAN, RICHARD D. IUE Observations of High-Redshift Quasars. *Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman*. **281**, 76, 61-F12 (1984)
- Reheating the Intergalactic Medium under Extremal Conditions. *Richard D. Sherman*. **282**, 387, 79-C3 (1984)
- Distribution Functions of Intergalactic Clouds. *Richard D. Sherman*. **284**, 457, 104-B9 (1984)
- SHEVGAONKAR, R. K. Three-dimensional Structures of Two Solar Active Regions from VLA Observations at 2, 6, and 20 Centimeter Wavelengths. *R. K. Shevgaonkar and M. R. Kundu*. **283**, 413, 90-D14 (1984)
- SHIBAZAKI, N. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. *Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- SHIELDS, G. A. The 3000 Å Bump in Quasars. *J. B. Oke, G. A. Shields, and D. G. Korycansky*. **277**, 64, 11-F1 (1984)
- IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovak, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
- SHIH, P. Hydrogen Production Rate from Comet Austin 1982g. *P. Shih, F. Scherb, and F. L. Roesler*. **279**, 453, 42-A1 (1984)
- SHIPMAN, H. L. Metal Abundances in the Hot DA White Dwarfs Wolf 1346 and Feige 24. *F. Wesemael, R. B. C. Henry, and H. L. Shipman*. **287**, 868, 143-F11 (1984)
- SHIPMAN, HARRY L. Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. *Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman*. **278**, 255, 26-F11 (1984)
- SHIVANANDAN, K. Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. *S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley*. **279**, 162, 38-F11 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. *T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen*. **286**, 573, 129-D9 (1984)
- SHLYAKHTER, A. I. The Effect of Inelastic Neutron Acceleration by Isomeric Nuclei on the s-Process Nucleosynthesis. *Yu. V. Petrov and A. I. Shlyakhter*. **278**, 385, 28-B8 (1984)
- SHORE, STEVEN N. The Galaxy as a Self-regulated Star-forming System: The Case of the OB Associations. *José Franco and Steven N. Shore*. **285**, 813, 120-C13 (1984)
- Spectrophotometry of the RS Canum Venaticorum Stars. II. A Study of Seven Systems from 4000-11000 Angstroms. *Steven N. Shore and Saul J. Adelman*. **54**, 151, 2-G8 (1984) (Abstr. in **275**, 929, 147-F2)
- The Early-Type Strong Emission-Line Supergiants of the Magellanic Clouds: A Spectroscopic Zoology. *Steven N. Shore and N. Sanduleak*. **55**, 1, 11-A2 (1984) (Abstr. in **279**, 909, 47-F14)
- SHU, FRANK H. The Collapse of the Cores of Slowly Rotating Isothermal Clouds. *Susan Terebey, Frank H. Shu, and Patrick Cassen*. **286**, 529, 129-A5 (1984)
- SHUDER, JAMES M. Emission-Line Profiles in Low-Redshift QSOs. *James M. Shuder*. **280**, 491, 55-C3 (1984)
- SHUKLA, PADMA K. Stimulated Compton Scattering of Hydromagnetic Waves in the Interstellar Medium. *Padma K. Shukla and John M. Dawson*. **276**, L49, 10-F7 (1984)
- SHULL, MICHAEL. Molecules in the Early Universe. *Stephen Lepp and Michael Shull*. **280**, 465, 55-A5 (1984)
- SHULL, PETER, JR. The Kinematics of the Crab Nebula's Jet. *Peter Shull, Jr., Uri Carsenty, Michael Sarcander, and Thorsten Neckel*. **285**, L75, 121-F9 (1984)
- SHULMAN, S. 3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. *J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz*. **286**, 681, 130-E9 (1984)
- SHURE, M. The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. *T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf*. **287**, L15, 138-D1 (1984)
- SHURE, M. A. Detection of the [Ne III] 36 Micron Line in the Planetary Nebula NGC 6543. *M. A. Shure, J. R. Houck, G. E. Gull, and T. Herter*. **281**, L29, 65-G1 (1984)
- Limits on the Infrared and Visual Luminosity of the Intergalactic H I Cloud in Leo. *M. F. Skrutskie, M. A. Shure, and S. Beckwith*. **282**, L65, 85-B13 (1984)
- The Electron Density in M82 from the S III Mid-Infrared Line Ratio. *J. R. Houck, M. A. Shure, G. E. Gull, and T. Herter*. **287**, L11, 138-C12 (1984)
- SIEGEL, MICHAEL J. The Abundance of Lithium in the Old Galactic Cluster NGC 7789. *Catherine A. Pilachowski, Jeremy R. Mould, and Michael J. Siegel*. **282**, L17, 78-B7 (1984)
- SIENKIEWICZ, RYSZARD. Helium Content of the Population II Binary System CM Draconis. *Bohdan Paczyński and Ryszard Sienkiewicz*. **286**, 332, 125-E3 (1984)
- SIEVEKA, E. M. Ejection of Atoms and Molecules from Io by Plasma-Ion Impact. *E. M. Sieveka and R. E. Johnson*. **287**, 418, 137-D12 (1984)
- SIEWERT, C. E. A High-Order Spherical Harmonics Solution to the Standard Problem in Radiative Transfer. *M. Benassi, R. D. M. Garcia, A. H. Karp, and C. E. Siewert*. **280**, 853, 59-B5 (1984)
- SIGALOTTI, LEONARDO DI G. The Equilibrium of Polytropic Self-gravitating Sheetlike Masses. *Miguel H. Ibáñez S. and Leonardo di G. Sigalotti*. **285**, 784, 120-A10 (1984)
- SILBERBERG, REIN. On the Abundances of Ultraheavy Cosmic Rays. *John R. Letaw, Rein Silberberg, and C. H. Tsao*. **279**, 144, 38-E6 (1984)
- Propagation of Heavy Cosmic-Ray Nuclei. *John R. Letaw, Rein Silberberg, and C. H. Tsao*. **56**, 369, 27-F9 (1984) (Abstr. in **285**, 875, 121-A6)
- SILK, JOSEPH. High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. *Edward B. Jenkins, George Wallerstein, and Joseph Silk*. **278**, 649, 33-A12 (1984)
- Massive Neutrinos and the Pancake Theory of Galaxy Formation. *Richard Schaeffer and Joseph Silk*. **281**, L13, 65-E14 (1984)
- Fine-Scale Anisotropy of the Cosmic Microwave Background in a Universe Dominated by Cold Dark Matter. *Nicola Vittorio and Joseph Silk*. **285**, L39, 121-C8 (1984)
- SILVERBERG, R. F. Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. *M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall*. **283**, 566, 93-A10 (1984)
- Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^{\circ}$ to $l = +62^{\circ}$: Structure and Energetics of the Inner Disk. *M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung*. **285**, 74, 110-F14 (1984)
- SILVERGLATE, PETER R. Observations of Heavy Element Radio Recombination Lines from C II Regions. *Peter R. Silverglate*. **278**, 604, 32-E1 (1984)
- Upper Limits to Magnetic Fields in C II Regions. *Peter R. Silverglate*. **279**, 694, 45-D7 (1984)
- SIME, D. G. The Corona near the Time of the 1983 June 11 Total Solar Eclipse. *D. G. Sime, R. R. Fisher, M. K. McCabe, and D. L. Mickey*. **278**, L123, 36-C11 (1984)
- The Sun as a Star: 1982 June 14-August 13. *R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime*. **280**, 873, 59-C11 (1984)
- Solar Activity Cycle Variation of the K Corona. *R. Fisher and D. G. Sime*. **285**, 354, 113-F14 (1984)

- Rotational Characteristics of the White-Light Solar Corona: 1965-1983. *R. Fisher and D. G. Sime*. **287**, 959, 144-F4 (1984)
- SIMKIN, S. M. Optical Properties of the Knots in NGC 7385. *S. M. Simkin, G. V. Bicknell, and A. Bosma*. **277**, 513, 17-F3 (1984)
- SIMNETT, G. M. The Impulsive Phase of a Solar Limb Flare. *G. M. Simnett and K. T. Strong*. **284**, 839, 108-B13 (1984)
- SIMON, M. Star Formation in the M8E Region. *M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders*. **278**, 170, 25-G8 (1984)
- Velocity-resolved Infrared Spectroscopy of LkHa 101. *M. Simon and L. Cassar*. **283**, 179, 88-A7 (1984)
- SIMON, NORMAN R. Phase Lags and Pulsation Modes of Classical Cepheids. *Norman R. Simon*. **284**, 278, 101-A13 (1984)
- SIMON, THEODORE. Rotational Modulation of the Chromospheric Activity in χ^1 Orionis (G0 V). *Ann Merchant Boesgaard and Theodore Simon*. **277**, 241, 13-E5 (1984)
- The Infrared Dust Shell around the WC9 Star Ve 2-45. *H. M. Dyck, Theodore Simon, and R. D. Wolstencroft*. **277**, 675, 19-D14 (1984)
- Sigma Gemminorum (K1 III + ?): Variability of the Ultraviolet Lines near Conjunction. *Thomas R. Ayres, Theodore Simon, and Jeffrey L. Linsky*. **279**, 197, 39-B8 (1984)
- On the Dispersion in Brightness of Far-Ultraviolet Emission Lines of Cool Giant Stars. *Theodore Simon*. **279**, 738, 45-G11 (1984)
- The T Tauri Radio Source. *P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell*. **280**, L23, 54-D13 (1984)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. *F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana*. **281**, 815, 71-D5 (1984)
- Infrared Observations of the Eclipse of ϵ Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. *D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga*. **284**, 799, 107-F8 (1984)
- SIMONETTI, J. H. Small-Scale Variation in the Galactic Magnetic Field: The Rotation Measure Structure Function and Birefringence in Interstellar Scintillations. *J. H. Simonetti, J. M. Cordes, and S. R. Spangler*. **284**, 126, 99-D9 (1984)
- SIMPSON, J. A. The Path-Length Distribution for Galactic Cosmic-Ray Propagation: An Energy-Dependent Depletion of Short Path Lengths. *M. Garcia-Munoz, T. G. Guzik, J. A. Simpson, and J. P. Wefel*. **280**, L13, 54-D4 (1984)
- Shock Acceleration of Nuclei and Electrons in the Heliosphere beyond 24 AU. *K. R. Pyle, J. A. Simpson, A. Barnes, and J. D. Mihalov*. **282**, L107, 85-E9 (1984)
- SIMPSON, J. P. Models of Four Highly Obscured Compact H II Regions. *J. P. Simpson and Robert H. Rubin*. **281**, 184, 63-A1 (1984)
- SINGH, HARINDER PAL. The Effect of Rotation and the Magnetic Field on Solar Luminosity. *Harinder Pal Singh, M. K. Das, and J. N. Tandon*. **277**, 862, 21-E1 (1984)
- SION, E. M. GD 323: A White Dwarf with a Stratified H/He Atmosphere? *James Liebert, F. Wesemael, E. M. Sion, and G. Wegner*. **277**, 692, 19-F3 (1984)
- IUE Spectrophotometry of the DA4 Primary in the Short-Period White Dwarf-Red Dwarf Spectroscopic Binary Case 1. *E. M. Sion, F. Wesemael, and E. F. Guinan*. **279**, 758, 46-B3 (1984)
- Feige 24: Wind/Flare Accretion by a Hot Dazl Degenerate. *E. M. Sion and S. G. Starrfield*. **286**, 760, 131-D7 (1984)
- SION, EDWARD M. Implications of the Absolute Magnitude Distribution Functions of DA and Non-DA White Dwarfs. *Edward M. Sion*. **282**, 612, 81-F10 (1984)
- SITKO, M. L. Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason*. **284**, 512, 104-F8 (1984)
- SITKO, MICHAEL L. Wavelength-Dependent Polarization in the Optical Flux of the BL Lacertae Object B2 1308 + 326. *Michael L. Sitko, Wayne A. Stein, and Gary D. Schmidt*. **282**, 29, 74-C6 (1984)
- Infrared Photometry of Globular Clusters in M31. *Michael L. Sitko*. **286**, 209, 124-C1 (1984)
- SKILLMAN, EVAN D. The Kinematics of Giant Extragalactic H II Regions. *Evan D. Skillman and Bruce Balick*. **280**, 580, 56-B11 (1984)
- SKINNER, T. E. IUE Observations of Longitudinal and Temporal Variations in the Jovian Auroral Emission. *T. E. Skinner, S. T. Durrance, P. D. Feldman, and H. W. Moos*. **278**, 441, 28-F11 (1984)
- SKRUTSKIE, M. F. Limits on the Infrared and Visual Luminosity of the Inter Galactic H I Cloud in Leo. *M. F. Skrutskie, M. A. Shure, and S. Beckwith*. **282**, L65, 85-B13 (1984)
- Discovery of Solar System-Size Halos around Young Stars. *S. Beckwith, B. Zuckerman, M. F. Skrutskie, and H. M. Dyck*. **287**, 793, 143-A2 (1984)
- SKUMANICH, A. The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. *A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston*. **282**, 776, 83-E3 (1984)
- SKUMANICH, ANDREW. Rapid Rotation and H α Emission Anomalies among Some Members of the Population of Low-Mass Stars. *Arthur Young, Andrew Skumanich, and Eugene Harlan*. **282**, 683, 82-D13 (1984)
- SLAGTER, R. J. Behavior of Higher Modes of Gravitational Waves and Gauge-invariant Density Perturbations in Bianchi IX Cosmological Models. *R. J. Slagter*. **286**, 379, 127-C1 (1984)
- SLETTEBAK, ARNE. Rotational Velocities of Later B Type and A Type Stars as Determined from Ultraviolet versus Visual Line Profiles. *Kenneth G. Carpenter, Arne Slettebak, and George Sonneborn*. **286**, 741, 131-C2 (1984)
- SLOVAK, M. IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovak, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
- SMARR, LARRY L. A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. *John F. Hawley, Larry L. Smarr, and James R. Wilson*. **277**, 296, 14-B9 (1984)
- A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration. *John F. Hawley, Larry L. Smarr, and James R. Wilson*. **55**, 211, 13-G13 (1984) (Abstr. in **280**, 938, 60-B2)
- SMATHERS, H. W. The HEAO A-1 X-Ray Source Catalog. *K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Riecke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock*. **278**, 521, 31-E14 (1984)
- SMITH, BRUCE. Stochastic Self-propagating Star Formation in Three-dimensional Disk Galaxy Simulations: Erratum. *Thomas Statler, Neil Comins, and Bruce Smith*. **280**, 937, 60-B1 (1984) (Orig. paper in **270**, 79, 77-G3)
- SMITH, BRUCE F. Gravitational Spurs and Resonances: Effects of Small Mass Disturbances in Spiral Galaxy Disks. *Gene G. Byrd, Bruce F. Smith, and Richard H. Miller*. **286**, 62, 122-E10 (1984)
- SMITH, D. Dissociative Recombination Coefficients for H $_2^+$, HCO $^+$, N $_2^+$, and CH $_2^+$ at Low Temperature: Interstellar Implications. *D. Smith and N. G. Adams*. **284**, L13, 103-A14 (1984)
- SMITH, DAVID. Theoretical Reinvestigation of Hydrocarbon and Cyanoacetylene Abundances in TMC-1. *Eric Herbst, Nigel G. Adams, and David Smith*. **285**, 618, 118-C7 (1984)
- SMITH, DEAN F. Microwave Signature of Thick-Target Electron Beams in Solar Flares. *A. Gordon Emslie and Dean F. Smith*. **279**, 882, 47-D10 (1984)
- SMITH, GRAEME H. A Search for Cyanogen Variations on the Lower Giant Branch of M3. *John Norris and Graeme H. Smith*. **287**, 255, 135-F5 (1984)
- SMITH, H. A. Infrared Emission from Accretion Disks: Detectability and Variability. *J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke*. **284**, 745, 107-B9 (1984)
- SMITH, HARDING E. He I λ 10830 Emission in Seyfert Galaxies and QSOs. *P. D. LeVan, R. C. Puetter, Harding E. Smith, and Richard J. Rudy*. **284**, 23, 98-B14 (1984)
- SMITH, HAYWOOD, JR. On the Characteristics of Clusters of Galaxies with Unseen Mass. *Haywood Smith, Jr.*. **285**, 16, 110-B7 (1984)
- SMITH, HORACE A. Metal Abundances of Galactic Globular Clusters. *Horace A. Smith*. **281**, 148, 62-E3 (1984)
- SMITH, HOWARD A. NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein*. **280**, 154, 50-F5 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper*. **284**, 597, 105-E12 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. *Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum*. **286**, 302, 125-C1 (1984)
- SMITH, J. NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein*. **280**, 154, 50-F5 (1984)
- SMITH, M. G. Observations of Three QSOs with Complex, Broad Absorp-

- tion Lines. D. A. Turnshek, R. J. Weymann, R. F. Carswell, and M. G. Smith. **277**, 51, 11-E1 (1984)
- Millimeter-Wave Observations of Flat Spectrum Radio Sources. W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nott, and J. V. Radostitz. **280**, 102, 50-B7 (1984)
- SMITH, MALCOLM G. The Absorption Line Profiles in Q1101-264. Robert F. Carswell, Donald C. Morton, Malcolm G. Smith, Alan N. Stockton, David A. Turnshek, and Ray J. Weymann. **278**, 486, 36-C6 (1984)
- SMITH, MYRON A. Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry. **282**, 226, 76-D2 (1984)
- SMITH, PETER L. Interstellar O_2 . I. Abundance, Excitation, and Prospects for Detection of $^{16}O^{18}O$ at Radio Frequencies. John H. Black and Peter L. Smith. **277**, 562, 18-B12 (1984)
- Interstellar O_2 . II. VUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman. **277**, 569, 18-C5 (1984)
- Laboratory Identification of the $3s^23p^2\ ^3P_{2,1}-3s3p^3\ ^5S_0$ Intersystem Lines of S III. Peter L. Smith, Carl Erik Magnusson, and Per Olof Zetterberg. **277**, 179, 23-A5 (1984)
- The Radiative Lifetime of the 5S_0 Metastable Level of O^{++} . B. Carol Johnson, Peter L. Smith, and R. D. Knight. **281**, 477, 65-B6 (1984)
- SMITH, WM. HAYDEN. A Search for Interstellar H_2O^+ in Diffuse Clouds. Wm. Hayden Smith, W. V. Schempp, and S. R. Federman. **277**, 196, 13-B2 (1984)
- Oscillator Strengths of the $C_2\ A^1\Pi_u-X^1\Sigma_g^+$ Phillips System. Sumner P. Davis, Wm. Hayden Smith, James W. Braut, Ruben Pecynier, and Jeremy Wagner. **287**, 455, 137-G7 (1984)
- SMYTH, W. H. Io's Sodium Directional Features: Evidence for a Magnetospheric-Wind-driven Gas Escape Mechanism. C. B. Pilcher, W. H. Smyth, M. R. Combi, and J. H. Fertel. **287**, 427, 137-E7 (1984)
- SNELL, RONALD L. Models of Molecular Clouds. I. Multitransition Study of CS. Ronald L. Snell, Lee G. Mundy, Paul F. Goldsmith, Neal J. Evans II, and Neal R. Erickson. **276**, 625, 8-D2 (1984)
- A Survey of High-Velocity Molecular Gas near Herbig-Haro Objects. II. Suzan Edwards and Ronald L. Snell. **281**, 237, 63-D13 (1984)
- Large-Scale Structure of Molecular Gas in Heiles Cloud 2: A Remarkable Rotating Ring. F. Peter Schloerb and Ronald L. Snell. **283**, 129, 87-D8 (1984)
- High-Velocity Molecular Jets. Ronald L. Snell, N. Z. Scoville, D. B. Sanders, and Neal R. Erickson. **284**, 176, 100-A8 (1984)
- Bipolar Outflows in Dark Clouds. Paul F. Goldsmith, Ronald L. Snell, Mark Hemeon-Heyer, and William D. Langer. **286**, 599, 129-F7 (1984)
- SNODGRASS, HERSCHEL B. Limits on Photospheric Doppler Signatures for Solar Giant Cells. Herschel B. Snodgrass and Robert Howard. **284**, 848, 108-C8 (1984)
- SNOW, T. P. Line Profile Variation in δ Orionis A, ϵ Orionis A, and 15 Monocerotis. C. A. Grady, T. P. Snow, and W. C. Cash. **283**, 218, 88-D4 (1984)
- SNOW, THEODORE P. Interstellar Abundances and Depletions Inferred from Observations of Neutral Atoms. Theodore P. Snow. **287**, 238, 135-E2 (1984)
- SNOW, THEODORE P., JR. Ultraviolet Extinction and Diffuse Band Strength Correlations. C. Gregory Seab and Theodore P. Snow, Jr. **277**, 200, 13-B6 (1984)
- Einstein Observations of X-Ray Emission from A Stars: Erratum. L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr. **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- SNYDER, L. E. Observations and Analysis of Circumstellar Cyanoacetylene. P. R. Jewell and L. E. Snyder. **278**, 176, 26-A1 (1984)
- SNYDER, W. A. Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambruster, W. A. Snyder, and K. S. Wood. **284**, 270, 101-A5 (1984)
- SODERBLUM, D. R. An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan. **276**, 254, 3-E12 (1984)
- SODERBLUM, DAVID R. Rotational Velocities of Low-Mass Stars in the Pleiades. John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham. **280**, 202, 51-C4 (1984)
- SOFIA, SABATINO. Turbulent Compressible Convection in a Deep Atmosphere. II. Two-Dimensional Results for Main-Sequence A5 and F0 Type Envelopes. Sabatino Sofia and Kwing L. Chan. **282**, 550, 81-B4 (1984)
- SOIFER, B. T. Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Paschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- Observations of Comet IRAS-Araki-Alcock 1983d. R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer. **278**, L11, 29-C14 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Infrared Emission from M31. H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer. **278**, L59, 30-A1 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier. **278**, L75, 30-C9 (1984)
- A 25 Micron Component in 3C 390.3. G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young. **278**, L79, 30-C14 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson. **283**, L1, 91-E3 (1984)
- SOKOLSKY, P. Limits on Astrophysical ν , Flux at $E_\gamma > 10^{19}$ eV. R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck. **281**, L9, 65-E10 (1984)
- Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. J. Boone, R. Cady, G. L. Cassidy, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech. **285**, 264, 112-G1 (1984)
- SOLOMON, P. M. Two-Fluid Gravitational Instabilities in a Galactic Disk. Chanda J. Jog and P. M. Solomon. **276**, 114, 2-B9 (1984)
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. Chanda J. Jog and P. M. Solomon. **276**, 127, 2-C8 (1984)
- Giant Molecular Clouds in the Galaxy. I. The Axisymmetric Distribution of H_2 . D. B. Sanders, P. M. Solomon, and N. Z. Scoville. **276**, 182, 2-G7 (1984)
- The Distribution of CO in the Galaxy for Longitudes 294° to 86° . B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon. **283**, L31, 97-A8 (1984)
- SOLTAN, ANDRZEJ. Very Low Luminosity Active Galaxies and the X-Ray Background. Martin Elvis, Andrzej Soltan, and William C. Keel. **283**, 479, 92-A13 (1984)
- SONEIRA, RAYMOND M. A Supercluster Catalog. Neta A. Bahcall and Raymond M. Soneira. **277**, 27, 11-C4 (1984)
- Detection of Binaries with Projected Separations as Large as 0.1 Parsec.

- David W. Latham, John Tonry, John N. Bahcall, Raymond M. Soneira, and Paul Schechter. **281**, L41, 66-G10 (1984)
- Comparisons of a Standard Galaxy Model with Stellar Observations in Five Fields. John N. Bahcall and Raymond M. Soneira. **55**, 67, 11-E12 (1984) (Abstr. in **279**, 910, 47-G1)
- SONNEBORN, GEORGE. Rotational Velocities of Later B Type and A Type Stars as Determined from Ultraviolet versus Visual Line Profiles. Kenneth G. Carpenter, Arne Slettebak, and George Sonneborn. **286**, 741, 131-C2 (1984)
- SPALDING, J. D. A High-Resolution Study of the Isotopes of Solar Flare Nuclei. R. A. Mewaldt, J. D. Spalding, and E. C. Stone. **280**, 892, 59-E4 (1984)
- The Isotopic Composition of the Anomalous Low-Energy Cosmic Rays. R. A. Mewaldt, J. D. Spalding, and E. C. Stone. **283**, 450, 91-A3 (1984)
- SPANGLER, S. R. Small-Scale Variation in the Galactic Magnetic Field: The Rotation Measure Structure Function and Birefringence in Interstellar Scintillations. J. H. Simonetti, J. M. Cordes, and S. R. Spangler. **284**, 126, 99-D9 (1984)
- SPARKE, LINDA S. Galactic Warps and the Shape of Heavy Halos. Linda S. Sparke. **280**, 117, 50-C8 (1984)
- SPENCER, J. H. Rapid Radio Variations in the Flux Density of BL Lacertae. K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Josties, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis. **277**, L30, 22-D11 (1984)
- SPICER, D. S. Beam-Return Current Systems in Solar Flares. D. S. Spicer and R. N. Sudan. **280**, 448, 53-G2 (1984)
- SPINRAD, H. Discovery of a New Gravitational Lens. S. Djorgovski and H. Spinrad. **282**, L1, 78-A2 (1984)
- SPINRAD, HYRON. 3C 324—An Extremely Distant Cluster Radio Galaxy. Hyron Spinrad and S. Djorgovski. **280**, L9, 54-C11 (1984)
- Spectroscopy of Extremely Distant Radio Galaxies. Hyron Spinrad and S. Djorgovski. **285**, L49, 121-D4 (1984)
- SPITZER, LYMAN, JR. Scattering of Shock Waves by a Spherical Cloud. Satoru Ikeuchi and Lyman Spitzer, Jr. **283**, 825, 96-A1 (1984)
- SRAMEK, R. A. Radio Emission from a Type I Supernova: SN 1983.51 in NGC 5236. R. A. Sramek, N. Panagia, and K. W. Weiler. **285**, L59, 121-E2 (1984)
- STAHLER, STEVEN W. The Cyanopolynes as a Chemical Clock for Molecular Clouds. Steven W. Stahler. **281**, 209, 63-B13 (1984)
- STAMM, W. Search for Discrete Gamma-Ray Sources Emitting at Energies Greater than 10^{15} eV. M. Samorski and W. Stamm. **277**, 897, 21-G9 (1984)
- STANGER, V. X-Ray Emission from M82. M. G. Watson, V. Stanger, and R. E. Griffiths. **286**, 144, 123-D12 (1984)
- STARK, ANTONY A. The Molecular Halo of M82. Antony A. Stark and Eric R. Carlson. **279**, 122, 38-C9 (1984)
- Kinematics of Molecular Clouds. I. Velocity Dispersion in the Solar Neighborhood. Antony A. Stark. **281**, 624, 69-D2 (1984)
- STARRFIELD, S. G. Feige 24: Wind/Flare Accretion by a Hot Dazl Degenerate. E. M. Sion and S. G. Starrfield. **286**, 760, 131-D7 (1984)
- STARRFIELD, SUMNER. Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. Sumner Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell. **281**, 800, 71-C4 (1984)
- STATLER, THOMAS. Stochastic Self-propagating Star Formation in Three-dimensional Disk Galaxy Simulations: Erratum. Thomas Statler, Neil Comins, and Bruce Smith. **280**, 937, 60-B1 (1984) (Orig. paper in **270**, 79, 77-G3)
- STAUFFER, JOHN R. Optical and Infrared Photometry of Late-Type Stars in the Pleiades. John R. Stauffer. **280**, 189, 51-B3 (1984)
- Rotational Velocities of Low-Mass Stars in the Pleiades. John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham. **280**, 202, 51-C4 (1984)
- Evolution of the Optical Spectrum of HM Sagittae: 1977–1982. John R. Stauffer. **280**, 695, 57-D7 (1984)
- STECHER, T. P. The Variation of Galactic Interstellar Extinction in the Ultraviolet. A. N. Witt, R. C. Bohlin, and T. P. Stecher. **279**, 698, 45-D11 (1984)
- STECHER, THEODORE P. Images in the Rocket Ultraviolet: Photometry of M101. Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher. **277**, 542, 18-A5 (1984)
- Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes. **280**, 615, 56-E7 (1984)
- STECK, D. Limits on Astrophysical ν , Flux at $E_\nu > 10^{19}$ eV. R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck. **281**, L9, 65-E10 (1984)
- Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. J. Boone, R. Cady, G. L. Cassidy, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech. **285**, 264, 112-G1 (1984)
- STEENMAN-CLARK, L. Analysis of Magnesium XI Line Profiles from Solar Active Regions. R. L. Blake, R. D. Cowan, H. Felthaus, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark. **282**, 784, 83-E13 (1984)
- STEIGMAN, G. Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive. **281**, 493, 68-A5 (1984)
- STEIMAN-CAMERON, THOMAS Y. Preferred Orbit Planes in Triaxial Galaxies. I. Tumbling about a Principal Axis. Thomas Y. Steiman-Cameron and Richard H. Durisen. **276**, 101, 2-A10 (1984)
- Preferred Orbit Planes in Triaxial Galaxies. II. Tumbling about a Nonprincipal Axis. Laurence P. David, Richard H. Durisen, and Thomas Y. Steiman-Cameron. **286**, 53, 122-E1 (1984)
- STEIMLE, T. C. Laboratory Measurements of the Millimeter-Wave Spectrum of Magnesium Monoxide. T. C. Steimle, Y. Azuma, and P. G. Carrick. **277**, L21, 16-B6 (1984)
- STEIN, W. A. Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- STEIN, WAYNE A. Wavelength-Dependent Polarization in the Optical Flux of the BL Lacertae Object B2 1308 + 326. Michael L. Sitko, Wayne A. Stein, and Gary D. Schmidt. **282**, 29, 74-C6 (1984)
- STEINER, J. E. Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman. **278**, 255, 26-F11 (1984)
- Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock. **280**, 688, 57-C14 (1984)
- Determination of the Mass of Globular Cluster X-Ray Sources. J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman. **282**, L13, 78-A13 (1984)
- STEINOLFSON, R. S. Radiative Tearing: Magnetic Reconnection on a Fast Thermal Instability Time Scale. R. S. Steinolfson and G. Van Hoven. **276**, 391, 5-A13 (1984)
- Radiative and Reconnection Instabilities: Filaments and Flares. G. Van Hoven, T. Tachi, and R. S. Steinolfson. **280**, 391, 53-B13 (1984)
- Thermal Ripples in a Resistive and Radiative Instability. R. S. Steinolfson. **281**, 854, 71-G3 (1984)
- STELLA, L. Magnetic Field Instabilities in Accretion Disks. L. Stella and R. Rosner. **277**, 312, 14-C11 (1984)
- Short-Term X-Ray Variability of the Globular Cluster Source 4U 1820 – 30 (NGC 6624). L. Stella, S. M. Kahn, and J. E. Grindlay. **282**, 713, 82-G4 (1984)
- STELLINGWERF, R. F. Convection in Pulsating Stars. III. The RR Lyrae Instability Strip. R. F. Stellingwerf. **277**, 322, 14-D7 (1984)
- Convection in Pulsating Stars. IV. Nonlinear Effects. R. F. Stellingwerf. **277**, 327, 14-D12 (1984)
- Convection in Pulsating Stars. V. Limit Cycle Characteristics. R. F. Stellingwerf. **284**, 712, 106-G1 (1984)
- STENCEL, R. E. High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres. **283**, 731, 95-A1 (1984)
- STENCEL, ROBERT E. The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- Changes in the Ultraviolet Spectrum of EG Andromedae. Robert E. Stencel. **281**, L75, 73-B10 (1984)
- STENGER, V. J. The Production of Very High Energy Photons and Neutrinos from Cosmic Proton Sources. V. J. Stenger. **284**, 810, 107-F7 (1984)
- STEPHENS, S. A. A Measurement of the Absolute Flux of Cosmic-Ray Electrons. R. L. Golden, B. G. Mauget, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse. **287**, 622, 141-A6 (1984)
- STERLING, ALPHONSE C. Resonant Heating: An Interpretation of Coronal Loop Data. Joseph V. Hollweg and Alphonse C. Sterling. **282**, L31, 78-C6 (1984)
- Alfvénic Resonances on Solar Spicules. Alphonse C. Sterling and Joseph V. Hollweg. **285**, 843, 120-F1 (1984)
- STERN, R. A. E2003 + 225: A $3^{h}42^{m}$ AM Herculis Type Binary System. J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal. **277**, 682, 19-E7 (1984)
- STEWART, G. C. The Mass Profile and Gas Content of M87. G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen. **278**, 536, 31-G1 (1984)

- The Prevalence of Cooling Flows in Clusters of Galaxies. G. C. Stewart, A. C. Fabian, C. Jones, and W. Forman. **285**, 1, 110-A6 (1984)
- STEWART, R. T. Associations between Coronal Mass Ejections and Metric Type II Bursts. N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels. **279**, 839, 47-A4 (1984)
- STIER, M. T. Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall. **283**, 566, 93-A10 (1984)
- STIER, M. T. Far-Infrared and CO Observations of the W33 Complex. M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino. **283**, 573, 93-B4 (1984)
- Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^{\circ}$ to $l = +62^{\circ}$: Structure and Energetics of the Inner Disk. M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung. **285**, 74, 110-F14 (1984)
- STINEBRING, DANIEL R. Multifrequency Timing Measurements on the Millisecond Pulsar PRS 1937 + 214. J. M. Cordes and Daniel R. Stinebring. **277**, L53, 22-F4 (1984)
- Pulsar Polarization Fluctuations. I. 1404 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, Joanna M. Rankin, J. M. Weisberg, and Valentin Borjokoff. **55**, 247, 14-D9 (1984) (Abstr. in **280**, 939, 60-B3)
- Pulsar Polarization Fluctuations. II. 800 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, J. M. Weisberg, Joanna M. Rankin, and Valentin Borjokoff. **55**, 279, 14-G7 (1984) (Abstr. in **280**, 939, 60-B3)
- STOCKE, J. T. 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccaro. **277**, 43, 11-D6 (1984)
- The Radio Properties of the Broad Absorption-Line Quasars. J. T. Stocke, C. B. Foltz, R. J. Weymann, and W. A. Christiansen. **280**, 476, 55-B2 (1984)
- STOCKE, JOHN T. X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. Tommaso Maccaro, Isabella M. Gioia, and John T. Stocke. **283**, 486, 92-B6 (1984)
- The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N -Log S . Isabella M. Gioia, Tommaso Maccaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub. **283**, 495, 92-C1 (1984)
- On the Surface Density of X-Ray Selected BL Lacertae Objects. Tommaso Maccaro, Isabella M. Gioia, Dario Maccagni, and John T. Stocke. **284**, L23, 109-A6 (1984)
- STOCKMAN, H. S. Discovery of the First Carbon Star in NGC 6822. M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman. **277**, L9, 16-A9 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga. **278**, 530, 31-F9 (1984)
- A Comparison of the Properties of Highly Polarized QSOs versus Low-Polarization QSOs. Richard L. Moore and H. S. Stockman. **279**, 465, 43-A5 (1984)
- The Optical Polarization Properties of "Normal" Quasars. H. S. Stockman, Richard L. Moore, and J. R. P. Angel. **279**, 485, 43-B11 (1984)
- STOCKTON, ALAN. Images and Spectra of the Host Galaxy of the QSO Markarian 1014. John W. MacKenty and Alan Stockton. **283**, 64, 86-F9 (1984)
- STOCKTON, ALAN N. The Absorption Line Profiles in Q1101-264. Robert F. Carswell, Donald C. Morton, Malcolm G. Smith, Alan N. Stockton, David A. Turnshek, and Ray J. Weymann. **278**, 486, 36-C6 (1984)
- STOKES, G. M. The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. A. J. Sawal, N. Grevesse, J. W. Brault, G. M. Stokes, and R. Zander. **282**, 330, 77-D9 (1984)
- STONE, E. C. Elemental Composition of Solar Energetic Particles. W. R. Cook, E. C. Stone, and R. E. Vogt. **279**, 827, 46-G3 (1984)
- A High-Resolution Study of the Isotopes of Solar Flare Nuclei. R. A. Mewaldt, J. D. Spalding, and E. C. Stone. **280**, 892, 59-E4 (1984)
- The Isotopic Composition of the Anomalous Low-Energy Cosmic Rays. R. A. Mewaldt, J. D. Spalding, and E. C. Stone. **283**, 450, 91-A3 (1984)
- Evidence that the Anomalous Cosmic-Ray Component is Singly Ionized. A. C. Cummings, E. C. Stone, and W. R. Webber. **287**, L99, 145-F8 (1984)
- STONE, J. Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. W. Y. Chou, Kayll Lake, and J. Stone. **281**, 560, 68-F2 (1984)
- STONE, R. G. Type II Solar Radio Bursts, Interplanetary Shocks, and Energetic Particle Events. H. V. Cane and R. G. Stone. **282**, 339, 77-E4 (1984)
- STONER, RONALD. C IV $\lambda 1550$ Emission Profiles in IUE Spectra of Seyfert 1 Galaxies. Ronald Stoner and Roger Ptak. **280**, 516, 55-D14 (1984)
- The Variable Component of the NGC 4151 IUE Spectrum: Evidence for an Expanding Spherical Emission Shell. Ronald Stoner, Roger Ptak, and Stephen Gregory. **285**, 69, 110-F9 (1984)
- STOREY, J. W. V. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey. **276**, 551, 7-E9 (1984)
- Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and J. W. V. Storey. **279**, L1, 42-D3 (1984)
- STOTHERS, RICHARD B. Long-Period Classical Cepheids: Theory versus Observation. T. Richard Carson and Richard B. Stothers. **276**, 593, 8-A11 (1984)
- Very Slow Classical Cepheids: Theoretical Models with Periods Longer than 50 Days. T. Richard Carson and Richard B. Stothers. **281**, 811, 71-D1 (1984)
- STOTTLEMYER, A. R. On the X-Ray Spectrum of the Volume Emissivity Arising from Abell Clusters. A. R. Stottlemeyer and E. A. Boldt. **279**, 511, 43-D9 (1984)
- STRATTON, B. C. Electron Density-Dependent Intensity Ratios of Highly Ionized Iron Lines: A Comparison of Theory and Experiment. B. C. Stratton, H. W. Moos, and M. Finkenthal. **279**, L31, 42-F3 (1984)
- STRITTMATTER, P. A. The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus. **280**, 542, 55-F13 (1984)
- STRITTMATTER, PETER A. Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke. **284**, L5, 103-A6 (1984)
- STROM, K. M. Massive Star Formation in NGC 6946. K. DeGioia-Eastwood, G. L. Grasdale, S. E. Strom, and K. M. Strom. **278**, 564, 32-B1 (1984)
- Narrow-Band Imaging and Velocity Maps of Young Stellar Objects: Initial Results. J. S. Morgan, S. C. Wolff, S. E. Strom, and K. M. Strom. **285**, L71, 121-E14 (1984)
- STROM, KAREN M. High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. Gary L. Grasdale, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castelaz. **283**, L57, 97-C6 (1984)
- STROM, R. G. The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus. **280**, 542, 55-F13 (1984)
- STROM, S. E. Massive Star Formation in NGC 6946. K. DeGioia-Eastwood, G. L. Grasdale, S. E. Strom, and K. M. Strom. **278**, 564, 32-B1 (1984)
- Narrow-Band Imaging and Velocity Maps of Young Stellar Objects: Initial Results. J. S. Morgan, S. C. Wolff, S. E. Strom, and K. M. Strom. **285**, L71, 121-E14 (1984)
- STROM, STEPHEN E. High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. Gary L. Grasdale, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castelaz. **283**, L57, 97-C6 (1984)
- STRONG, K. T. Interpretation of Microwave Active Region Structures Using SMM Soft X-Ray Observations. K. T. Strong, C. E. Alisandrakis, and M. R. Kundu. **277**, 865, 21-E4 (1984)
- The Impulsive Phase of a Solar Limb Flare. G. M. Simnett and K. T. Strong. **284**, 839, 108-B13 (1984)
- STRUBLE, MITCHELL F. Velocity Distribution of Virgo Cluster Galaxies. Christ Fraclas, Michael N. Fanelli, and Mitchell F. Struble. **282**, 19, 74-B10 (1984)
- STRUCK-MARCELL, CURTIS. Continuum Models for Gas in Disturbed Galaxies. I. Model Equations. John M. Scalo and Curtis Struck-Marcell. **276**, 60, 1-E9 (1984)
- Continuum Models for Gas in Disturbed Galaxies. II. Stability of Simplified Model Systems. Curtis Struck-Marcell and John M. Scalo. **277**, 132, 12-D3 (1984)
- STRYKER, L. L. A Search for Radial Velocity Variations in the Blue Stragglers of NGC 7789. L. L. Stryker and B. J. Hrivnak. **278**, 215, 26-C13 (1984)
- Faint Star Studies in the Magellanic Clouds. II. Field Regions 9° Northeast of the Large Magellanic Cloud Bar. L. L. Stryker. **55**, 127, 13-A2 (1984) (Abstr. in **280**, 938, 60-B2)
- SUBRAMANIAN, K. The Quasar Q2345 + 007A, B: A Case for the Double Gravitational Lens? K. Subramanian and S. M. Chitre. **276**, 440, 6-D2

- (1984)
Gravitational Lens Models for the Triple Radio Source MG 2016 + 112. *D. Narasimha, K. Subramanian, and S. M. Chitre.* **283**, 512, 92-D9 (1984)
- SUDAN, R. N. Beam-Return Current Systems in Solar Flares. *D. S. Spicer and R. N. Sudan.* **280**, 448, 53-G2 (1984)
- SUGITANI, K. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L73, 85-C6 (1984)
- SULENTIC, JACK W. Redshift Differentials in a Complete Sample of Galaxy Groups. *Jack W. Sulentic.* **286**, 442, 127-G12 (1984)
- SURRATT, G. T. Quantal Calculations of Charge Transfer in Collisions between N V and Atomic Hydrogen. *C. A. Feickert, R. J. Blint, G. T. Surritt, and W. D. Watson.* **286**, 371, 126-A1 (1984)
- SUSSKIND, J. The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. *S. J. Daut, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault.* **280**, 921, 59-G9 (1984)
- SUTHERLAND, P. G. X-Ray Observations of X Persei. *M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Narayan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland.* **278**, 711, 33-F5 (1984)
- SUTHERLAND, PETER G. Models for Type I Supernovae: Partially Incinerated White Dwarfs. *Peter G. Sutherland and J. Craig Wheeler.* **280**, 282, 52-B2 (1984)
- SUTTON, E. C. On the Interpretation of the Broad-Band Millimeter-Wave Flux from Orion. *E. C. Sutton, Geoffrey A. Blake, C. R. Masson, and T. G. Phillips.* **283**, L41, 97-B4 (1984)
- ¹³CH₃OH in OMC-1. *Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia.* **286**, 586, 129-E8 (1984)
- SUZUKI, H. Detection of U45.379: An Intense, Peculiar Unidentified Line. *H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito.* **282**, 197, 76-B1 (1984)
- SWANK, J. VV Puppiis: The Soft X-Ray Machine. *Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White.* **279**, 785, 46-D3 (1984)
- The X-Ray Nebula around PSR 1509 - 58. *F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank.* **281**, 650, 69-E14 (1984)
- X-Rays from Eta Carinae. *T. Chlebowski, F. D. Seward, J. Swank, and A. Szymkowiak.* **281**, 665, 69-G1 (1984)
- SWANK, J. H. MXB 1916 - 053/4U 1915 - 05: Burst Properties and Constraints on a 50 Minute Binary Secondary. *J. H. Swank, R. E. Taam, and N. E. White.* **277**, 274, 14-A1 (1984)
- Models of the Hard X-Ray Spectrum of AM Herculis and Implications for the Accretion Rate. *J. H. Swank, A. C. Fabian, and R. R. Ross.* **280**, 734, 57-G3 (1984)
- The 41.5 Day Binary X-Ray Pulsar 4U 1223 - 62 (GX 301 - 2). *N. E. White and J. H. Swank.* **287**, 856, 143-E13 (1984)
- SWANK, JEAN H. IUE Observations of Centaurus X-4 during the 1979 May Outburst. *William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank.* **278**, 270, 27-A1 (1984)
- SWANSON, P. N. 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. *T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann.* **283**, 106, 87-B13 (1984)
- A Search for 183 GHz Emission from Water in Late-Type Stars. *T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodriguez Kuiper, and P. Zimmermann.* **286**, 310, 125-C9 (1984)
- SYGNET, J. F. Stability of Gravitational Systems and Gravothermal Catastrophe in Astrophysics. *J. F. Sygnet, G. Des Forêts, M. Lachieze-Rey, and R. Pellat.* **276**, 737, 9-E5 (1984)
- SYMBALISTY, EUGENE M. D. Magnetorotational Iron Core Collapse. *Eugene M. D. Symbalisty.* **285**, 729, 119-D10 (1984)
- SZALAY, ALEXANDER S. Angular Correlations of Galaxies to $B = 24$: Another Probe of Cosmology and Galaxy Evolution. *David C. Koo and Alexander S. Szalay.* **282**, 390, 79-C7 (1984)
- SZEGO, K. The Friable Sponge Model of a Cometary Nucleus. *M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Korosmezey, K. Kecskemeti, A. F. Nagy, and K. Szego.* **278**, 449, 28-G5 (1984)
- SKODY, PAULA. Radial Velocity Studies of Cataclysmic Binaries. II. The Ultrashort Period Dwarf Nova T Leonis. *Allen W. Shafter and Paula Szkody.* **276**, 305, 4-B7 (1984)
- An Unprecedented UV/Optical Flare in TV Columbae. *Paula Szkody and Mario Mateo.* **280**, 729, 57-F13 (1984)
- IR Geminorum: Indications of a Massive White Dwarf and a Heated Secondary in this New SU Ursae Majoris Cataclysmic Variable. *Paula Szkody, Allen W. Shafter, and Anne P. Cowley.* **282**, 236, 76-D12 (1984)
- SZTAJNO, M. X-Ray Observations of the Burst Source MXB 1728 - 34. *E. M. Basinska, W. H. G. Lewin, M. Sztajno, L. R. Cominsky, and F. J. Marshall.* **281**, 337, 64-E9 (1984)
- Evidence for 4.4 Hour Periodic Dips in the X-Ray Flux from 4U 1755-33. *N. E. White, A. N. Parmar, M. Sztajno, H. U. Zimmermann, K. O. Mason, and S. M. Kahn.* **283**, L9, 91-E11 (1984)
- SZYMKOWIAK, A. The X-Ray Nebula around PSR 1509 - 58. *F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank.* **281**, 650, 69-E14 (1984)
- X-Rays from Eta Carinae. *T. Chlebowski, F. D. Seward, J. Swank, and A. Szymkowiak.* **281**, 665, 69-G1 (1984)
- TAAM, R. E. MXB 1916 - 053/4U 1915 - 05: Burst Properties and Constraints on a 50 Minute Binary Secondary. *J. H. Swank, R. E. Taam, and N. E. White.* **277**, 274, 14-A1 (1984)
- TAAM, RONALD E. Supernovae in Cataclysmic Variable Systems and the Formation of Low-Mass X-Ray Binaries. *Ronald E. Taam and B. A. Fryxell.* **279**, 166, 38-G2 (1984)
- Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. *Peter Bodenheimer and Ronald E. Taam.* **280**, 771, 58-C7 (1984)
- The Evolution of the Inner Regions of Viscous Accretion Disks Surrounding Neutron Stars. *Ronald E. Taam and D. N. C. Lin.* **287**, 761, 142-E12 (1984)
- The Spectra of X-Ray Bursting Neutron Stars. *Richard A. London, Ronald E. Taam, and W. Michael Howard.* **287**, L27, 138-D14 (1984)
- TACHI, T. Radiative and Reconnection Instabilities: Filaments and Flares. *G. Van Hoven, T. Tachi, and R. S. Steinolfson.* **280**, 391, 53-B13 (1984)
- TAKABA, H. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L73, 85-C6 (1984)
- TAKAHASHI, K. The s-Process Branching at ¹⁵¹Sm. *H. Beer, F. Kappeler, K. Yokoi, and K. Takahashi.* **278**, 388, 28-B11 (1984)
- TAKAKURA, T. Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. *S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo.* **280**, 887, 59-D12 (1984)
- Hard X-Ray Imaging of a Solar Two-Ribbon Flare on 1981 August 21. *T. Takakura, K. Ohki, N. Nitta, and J. L. Wang.* **281**, L51, 67-A5 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. *S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara.* **284**, 827, 108-A11 (1984)
- TAKALO, L. O. E2003 + 225: A 3^h42^m AM Herculis Type Binary System. *J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal.* **277**, 682, 19-E7 (1984)
- TAKANO, T. High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L73, 85-C6 (1984)
- TALLANT, A. On the Photoproduction of Triply Ionized Carbon and Silicon in the Galactic Halo. *T. W. Hartquist, M. Pettini, and A. Tallant.* **276**, 519, 7-C4 (1984)
- TAMMANN, G. A. The Effect of the Perturbation of the Local Velocity Field by Virgo on the Calculation of Differential Luminosity Functions. *R. G. Kraan-Korteweg, Allan Sandage, and G. A. Tammann.* **283**, 24, 86-C7 (1984)
- TAN, TAI-HO. The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. *Joseph E. Borovsky, Morris B. Pongratz, Robert A. Roussel-Dupré, and Tai-Ho Tan.* **280**, 802, 58-E10 (1984)
- TANABE, TOSHIHIKO. Infrared Spectrum of the Laboratory-Synthesized Quenched Carbonaceous Composite (QCC): Comparison with the Infrared Unidentified Emission Bands. *Akira Sakata, Setsuko Wada, Toshihiko Tanabe, and Takashi Onaka.* **287**, L51, 138-F9 (1984)
- TANAKA, K. Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. *S. Tsuneta, T. Takakura, N. Nitta, K. Ohki,*

- K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo. **280**, 887, 59-D12 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the *HINOTORI* Spacecraft. S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara. **284**, 827, 108-A11 (1984)
- TANAKA, KATSUO. Solar Flare Iron K α Emission Associated with a Hard X-Ray Burst. *Katsuo Tanaka, Tetsuya Watanabe, and Nariaki Nitta*. **282**, 793, 83-F8 (1984)
- TANAKA, WATARU. Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). *Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi*. **280**, 213, 51-D1 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130–200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. *Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira*. **287**, 359, 136-G7 (1984)
- TANAKA, Y. A Very Long X-Ray Burst with a Precursor from XB 1715 – 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 – 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- TANANBAUM, H. X-Ray Variability of Quasars. G. Zamorani, P. Giommi, T. Maccacaro, and H. Tananbaum. **278**, 28, 24-C11 (1984)
- A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitielli. **283**, 50, 86-E7 (1984)
- TANDBERG-HANSEN, EINAR. Correlated Observations of Impulsive UV and Hard X-Ray Bursts in Solar Flares from the Solar Maximum Mission. *Chung-Chieh Cheng, Einar Tandberg-Hansen, and L. E. Orwig*. **278**, 853, 35-B11 (1984)
- TANDON, J. N. The Effect of Rotation and the Magnetic Field on Solar Luminosity. *Harinder Pal Singh, M. K. Das, and J. N. Tandon*. **277**, 862, 21-E1 (1984)
- On Stellar Models with an Isothermal Core in the Presence of a Magnetic Field. M. K. Das, Jayanta Kar, and J. N. Tandon. **281**, 292, 64-B4 (1984)
- TANG, K.-K. The Energy Spectrum of Electrons and Cosmic-Ray Confinement: A New Measurement and Its Interpretation. K.-K. Tang. **278**, 881, 35-D13 (1984)
- TANZI, E. G. Coordinated UV and Optical Observations of the AM Herculis Object E1405 – 451 in the High and Low States. L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidau, and M. M. Phillips. **285**, 214, 112-C6 (1984)
- TAPIA, S. E2003 + 225: A 3^h42^m AM Herculis Type Binary System. J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal. **277**, 682, 19-E7 (1984)
- TASSOUL, JEAN-LOUIS. Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. *Monique Tassoul and Jean-Louis Tassoul*. **279**, 384, 41-B9 (1984)
- Meridional Circulation in Rotating Stars. VIII. The Solar Spin-down Problem. *Monique Tassoul and Jean-Louis Tassoul*. **286**, 350, 125-F7 (1984)
- TASSOUL, MONIQUE. Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. *Monique Tassoul and Jean-Louis Tassoul*. **279**, 384, 41-B9 (1984)
- Meridional Circulation in Rotating Stars. VIII. The Solar Spin-down Problem. *Monique Tassoul and Jean-Louis Tassoul*. **286**, 350, 125-F7 (1984)
- TATUM, J. B. A Set of Partition Functions and Equilibrium Constants for 300 Diatomic Molecules of Astrophysical Interest. A. J. Sawal and J. B. Tatum. **56**, 193, 25-A2 (1984) (Abstr. in **284**, 869, 108-E1)
- TAWARA, Y. A Very Long X-Ray Burst with a Precursor from XB 1715 – 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 – 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- Short-Term X-Ray Variability of GX 339-4. Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi. **285**, 712, 119-C7 (1984)
- TAYLOR, A. R. Two-Frequency Radio Spectra during the Outburst of the Periodic Radio Star LSI + 61°303. A. R. Taylor and P. C. Gregory. **283**, 273, 89-A6 (1984)
- A Radio Survey of Symbiotic Stars. E. R. Seaquist, A. R. Taylor, and S. Button. **284**, 202, 100-C7 (1984)
- Radio Emission from Symbiotic Stars: A Binary Model. A. R. Taylor and E. R. Seaquist. **286**, 263, 124-F14 (1984)
- TAYLOR, BENJAMIN J. Energy Distributions for 12 Solar-Type Stars and Synthetic UV Photometry of the Sun. *Benjamin J. Taylor*. **54**, 167, 3-B1 (1984) (Abstr. in **275**, 930, 147-F3)
- An Augmented System of Secondary Standards for Bright-Star Spectrophotometry. *Benjamin J. Taylor*. **54**, 259, 5-B1 (1984) (Abstr. in **276**, 799, 10-B11)
- TEEGARDEN, B. 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zechenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch. **286**, L5, 126-D7 (1984)
- TEEGARDEN, B. J. The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury. **278**, 112, 25-C4 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Bocelet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes. **279**, 177, 39-A1 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zechenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- TELESCO, C. M. 2 to 20 Micron Observations of Mass Loss from Early-Type Stars. *David C. Abbott, C. M. Telesco, and Sidney C. Wolff*. **279**, 225, 39-D14 (1984)
- Infrared Observations of the 3C 273 Jets. J. Patrick Henry, E. E. Becklin, and C. M. Telesco. **280**, 98, 50-B1 (1984)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper. **282**, 427, 79-G4 (1984)
- Ongoing Star Formation in NGC 3310: An Infrared Perspective. C. M. Telesco and Ian Gatley. **284**, 557, 105-B12 (1984)
- TENNANT, A. F. Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini. **279**, 555, 44-A1 (1984)
- TEREBEY, SUSAN. The Collapse of the Cores of Slowly Rotating Isothermal Clouds. *Susan Terebey, Frank H. Shu, and Patrick Cassen*. **286**, 529, 129-A5 (1984)
- TERLEVICH, ROBERTO. Nine New Quasi-stellar Objects with Broad Absorption Lines. C. Hazard, Donald C. Morton, Roberto Terlevich, and Richard McMahon. **282**, 33, 74-C10 (1984)
- TERRELL, J. Long-Term Observations of X-Ray Sources: The Aquila-Serpens-Scutum Region. W. C. Priedhorsky and J. Terrell. **280**, 661, 57-A14 (1984)
- Discovery of a 176 Day Period in 4U 1820 – 30. W. Priedhorsky and J. Terrell. **284**, L17, 103-B4 (1984)
- TERRELL, JAMES. The 1973 X-Ray Transient V0332 + 53. *James Terrell and William C. Priedhorsky*. **285**, L15, 114-G1 (1984)
- TERZIAN, YERVANT. Ultraviolet Radiation from White Dwarfs and the

- Carbon Ionization in the Galactic Halo. *Nino Panagia and Yervant Terzian*. **287**, 315, 136-D5 (1984)
- TESKE, RICHARD G. Coronal [Fe] Lines in Supernova Remnants: Non-equilibrium Ionization Models. *Richard G. Teske*. **277**, 832, 21-B13 (1984)
- THADDEUS, P. Identification of the SiCC Radical toward IRC +10216: The First Molecular Ring in an Astronomical Source. *P. Thaddeus, S. E. Cummins, and R. A. Linke*. **283**, L45, 97-B8 (1984)
- THIELEMANN, F.-K. Explosive Nucleosynthesis of Type I Supernovae. *K. Nomoto, F.-K. Thielemann, and J. C. Wheeler*. **279**, L23, 42-E9 (1984)
- Explosive Nucleosynthesis and Type I Supernovae: Erratum. *K. Nomoto, F.-K. Thielemann, and J. C. Wheeler*. **283**, L25, 91-F12 (1984) (Orig. paper in **279**, L23, 42-E9)
- THIELEMANN, FRIEDRICH-K. Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. *Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi*. **286**, 644, 130-B14 (1984)
- THIELHEIM, K. O. The Self-consistent Response of Stellar Disks to Bar Forcing. *K. O. Thielheim and H. Wolff*. **276**, 135, 2-D2 (1984)
- THOMAS, JOHN H. Dynamical Phenomena in Sunspots. I. Observing Procedures and Oscillatory Phenomena. *John H. Thomas, Lawrence E. Cram, and Alan H. Nye*. **285**, 368, 114-A1 (1984)
- Dynamical Phenomena in Sunspots. II. A Moving Magnetic Feature. *Alan H. Nye, John H. Thomas, and Lawrence E. Cram*. **285**, 381, 114-A14 (1984)
- THOMPSON, DEANNE. High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. *Gary L. Grasdale, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castetaz*. **283**, L57, 97-C6 (1984)
- THOMPSON, LAIRD A. High-Resolution Imaging from Mauna Kea: Cygnus A. *Laird A. Thompson*. **279**, L47, 48-B2 (1984)
- The A2197 and A2199 Galaxy Clusters. *Stephen A. Gregory and Laird A. Thompson*. **286**, 422, 127-F4 (1984)
- THOMPSON, RODGER I. Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. *Bel Campbell and Rodger I. Thompson*. **279**, 650, 45-A5 (1984)
- Lyman and Balmer Continuum Ionization in Zero-Age Main-Sequence Stars: Applications to the Line Excess Phenomenon. *Rodger I. Thompson*. **283**, 165, 87-G7 (1984)
- THORNE, L. R. The Chemistry of Phosphorus in Dense Interstellar Clouds. *L. R. Thorne, V. G. Anicich, S. S. Prasad, and W. T. Huntress, Jr.* **280**, 139, 50-E3 (1984)
- THORSTENSEN, J. R. Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. *A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles*. **286**, 196, 124-B2 (1984)
- THRONSON, H. A., JR. Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. *M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall*. **283**, 566, 93-A10 (1984)
- THRONSON, HARLEY A., JR. NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein*. **280**, 154, 50-F5 (1984)
- The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. *Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr.* **281**, 303, 64-C1 (1984)
- A Search for High-Velocity Carbon Monosulfide Emission in Star-Forming Regions. *Harley A. Thronson, Jr. and Charles J. Lada*. **284**, 135, 99-E4 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper*. **284**, 597, 105-E12 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. *Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum*. **286**, 302, 125-C1 (1984)
- THUAN, TRINH X. Ultraviolet Observations of Starburst and Mini-Seyfert Galactic Nuclei. *Trinh X. Thuan*. **281**, 126, 62-C9 (1984)
- Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. *Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen*. **285**, 515, 117-B6 (1984)
- TIELENS, A. G. G. M. Absorption Features in the 5-8 Micron Spectra of Protostars. *A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn*. **287**, 697, 142-A1 (1984)
- TIFFT, W. G. Global Redshift Quantization. *W. G. Tift and W. J. Cocke*. **287**, 492, 139-E4 (1984)
- TOHLINE, JOEL E. The Collapse of Rotating Stellar Cores: Equilibria between White Dwarf and Neutron Star Densities. *Joel E. Tohline*. **285**, 721, 119-D2 (1984)
- TOJO, ARATA. CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaiju, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane*. **283**, 117, 87-C10 (1984)
- TOKUNAGA, A. Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. *D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga*. **284**, 799, 107-F8 (1984)
- TOKUNAGA, A. T. Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga*. **284**, 523, 104-G5 (1984)
- TOKUNAGA, ALAN T. The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga*. **278**, 530, 31-F9 (1984)
- The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. *Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner*. **280**, 521, 55-E6 (1984)
- Infrared Photometry of Comet Bowell and Other Comets. *Michael F. A'Hearn, Eliahu Dwek, and Alan T. Tokunaga*. **282**, 803, 83-G4 (1984)
- TOMKIN, JOCELYN. Nitrogen Abundances in Disk and Halo Dwarfs. *Jocelyn Tomkin and David L. Lambert*. **279**, 220, 39-D8 (1984)
- S Cancri: A Semidetached System with a Very Low Mass Secondary. *Daniel M. Popper and Jocelyn Tomkin*. **285**, 208, 112-B14 (1984)
- TONRY, JOHN. Detection of Binaries with Projected Separations as Large as 0.1 Parsec. *David W. Latham, John Tonry, John N. Bahcall, Raymond M. Soneira, and Paul Schechter*. **281**, L41, 66-G10 (1984)
- TONRY, JOHN L. Constraints on the Orbits of Multiple Nuclei in Brightest Cluster Galaxies. *John L. Tonry*. **279**, 13, 37-B5 (1984)
- Evidence for a Central Mass Concentration in M32. *John L. Tonry*. **283**, L27, 97-A4 (1984)
- TOOMRE, JURI. Two-Dimensional Compressible Convection Extending over Multiple Scale Heights. *Neal E. Hurlburt, Juri Toomre, and Joseph M. Massaguer*. **282**, 557, 81-B11 (1984)
- Frequent Ultraviolet Brightenings Observed in a Solar Active Region with Solar Maximum Mission. *Jason G. Porter, Juri Toomre, and Katharine B. Gebbie*. **283**, 879, 96-D14 (1984)
- TORBETT, MICHAEL V. Hydrodynamic Ejection of Bipolar Flows from Objects Undergoing Disk Accretion: T Tauri Stars, Massive Pre-Main-Sequence Objects, and Cataclysmic Variables. *Michael V. Torbett*. **278**, 318, 27-D10 (1984)
- TORNAMBÈ, AMEDEO. On the Evolution of an Intermediate-Mass Zero-Metal Star Which Does Not Experience Thermal Instabilities during the Double Shell Burning Phase. *Alessandro Chieffi and Amedeo Tornambè*. **287**, 745, 142-D10 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. *Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè*. **287**, 749, 142-D14 (1984)
- TORRES, ANA V. The Spectra of Wolf-Rayet Stars. II. The WC 9 Subclass. *Ana V. Torres and Peter S. Conti*. **280**, 181, 51-A6 (1984)
- TOWNES, C. H. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. *R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey*. **276**, 551, 7-E9 (1984)
- Diffraction-limited Spatial Resolution of Circumstellar Dust Shells at 10 Microns. *E. E. Bloemhof, C. H. Townes, and A. H. B. Vanderwyck*. **276**, L21, 5-F10 (1984)
- Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. *Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and J. W. V. Storey*. **279**, L1, 42-D3 (1984)
- Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. *M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson*. **282**, L81, 85-C12 (1984)
- TRAMIEL, LEONARD J. Polarization Evidence for the Isotropy of Electrons Responsible for the Production of 5-20 keV X-Rays in Solar Flares. *Leonard J. Tramiel, Gary A. Chanan, and R. Novick*. **280**, 440, 53-F8 (1984)
- TREMAINE, SCOTT. A Kinematic Method for Measuring the Pattern Speed of Barred Galaxies. *Scott Tremaine and Martin D. Weinberg*. **282**, L5, 78-A6 (1984)
- Excitation of Inclinations in Ring-Satellite Systems. *Nicole Borderies, Peter Goldreich, and Scott Tremaine*. **284**, 429, 102-E10 (1984)
- A General Method for Constructing Spherical Galaxy Models. *Douglas O. Richstone and Scott Tremaine*. **286**, 27, 122-C3 (1984)
- TRESCH-FIENBERG, RICHARD. High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. *John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio*. **279**, 685, 45-C12 (1984)
- TREUMANN, R. A. Analysis of Solar Flare Gamma-Ray Events. *C. Koweliotou, R. A. Treumann, and M. Scholer*. **278**, 420, 28-E1 (1984)
- TREVES, A. Two-Temperature Model of Spherical Accretion onto a Black Hole. *M. Colpi, L. Maraschi, and A. Treves*. **280**, 319, 52-D11 (1984)

- Coordinated UV and Optical Observations of the AM Herculis Object E1405 - 451 in the High and Low States. *L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips*. **285**, 214, 112-C6 (1984)
- TRINCHIERI, G. An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **277**, 115, 12-B12 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- X-Ray Observations of Spiral Galaxies. I. Integrated Properties. *G. Fabbiano, G. Trinchieri, and A. Macdonald*. **284**, 65, 98-E14 (1984)
- The Complex X-Ray Emission of NGC 253. *G. Fabbiano and G. Trinchieri*. **286**, 491, 128-D14 (1984)
- TRIPICCO, MICHAEL J. The Ionization Mechanism for Gas in the Nuclei of NGC 1052 and NGC 4278. *James A. Rose and Michael J. Tripicco*. **285**, 55, 110-E9 (1984)
- TRIVEDI, B. M. P. Mass Loss from the Proto-Sun: Formation and Evolution of the Solar Nebula. *B. M. P. Trivedi*. **281**, 375, 65-A9 (1984)
- TROLAND, T. H. Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson*. **276**, 572, 7-G4 (1984)
- SiO Flux Measurements of Variable Stars. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson*. **283**, 174, 88-A2 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). *J. S. Miller, F. O. Clark, and T. H. Troland*. **287**, 892, 144-A7 (1984)
- TRURAN, J. W. IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovák, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
- TRURAN, JAMES W. On the Production of Technetium in Thermally Pulsing Red Giant Stars. *Kenneth R. Cosner, Keith H. Despain, and James W. Truran*. **283**, 313, 89-D7 (1984)
- TSAO, C. H. On the Abundances of Ultraheavy Cosmic Rays. *John R. Letaw, Rein Silberberg, and C. H. Tsao*. **279**, 144, 38-E6 (1984)
- Propagation of Heavy Cosmic-Ray Nuclei. *John R. Letaw, Rein Silberberg, and C. H. Tsao*. **56**, 369, 27-F9 (1984) (Abstr. in **285**, 875, 121-A6)
- TSINGANOS, K. A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos*. **277**, L35, 22-E1 (1984)
- TSINGANOS, K. C. On the Topological Stability of Magnetostatic Equilibria. *K. C. Tsinganos, J. Distler, and R. Rosner*. **278**, 409, 28-D4 (1984)
- TSUNEMI, H. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. *Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. *S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara*. **284**, 827, 108-A11 (1984)
- TSUNO, K. Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- TUCKER, W. Clusters of Galaxies as a Probe of the Intergalactic Medium. *W. Forman, C. Jones, and W. Tucker*. **277**, 19, 11-B10 (1984)
- TUELLER, J. The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury*. **278**, 112, 25-C4 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. *J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes*. **279**, 177, 39-A1 (1984)
- TULLY, R. BRENT. Infall of Galaxies into the Virgo Cluster and Some Cosmological Constraints. *R. Brent Tully and Edward J. Shaya*. **281**, 31, 61-C8 (1984)
- The Angular Momentum Content of Galaxies. *Edward J. Shaya and R. Brent Tully*. **281**, 56, 61-E6 (1984)
- Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. *R. Brent Tully and S. C. Wolff*. **281**, 67, 61-F3 (1984)
- TUOHY, I. R. The Magnetic Field of the AM Herculis Object H0139-68. *D. T. Wickramasinghe, N. Visvanathan, and I. R. Tuohy*. **286**, 328, 125-D13 (1984)
- Supernova Remnants in the Magellanic Clouds. *D. S. Mathewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle*. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- TUOHY, IAN R. Spectrophotometry of Young Supernova Remnants. *Michael A. Dopita and Ian R. Tuohy*. **282**, 135, 75-D7 (1984)
- Radiative Shock Wave Theory. III. The Nature of the Optical Emission in Young Supernova Remnants. *Michael A. Dopita, Luc Binette, and Ian R. Tuohy*. **282**, 142, 75-D14 (1984)
- X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. *John J. Nugent, Steven H. Pravdo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler*. **284**, 612, 105-F13 (1984)
- TUPPER, B. O. J. Imperfect Fluid Cosmologies with Thermodynamics: Some Exact Solutions. *A. A. Coley and B. O. J. Tupper*. **280**, 26, 49-C6 (1984)
- TURNER, B. E. Methyl Acetylene as a Temperature Probe for Dense Interstellar Clouds. *T. B. H. Kuiper, E. N. Rodriguez Kuiper, Dale F. Dickinson, B. E. Turner, and B. Zuckerman*. **276**, 211, 3-B9 (1984)
- Shell Structure in Ultracompact H II Regions. *B. E. Turner and H. E. Matthews*. **277**, 164, 12-F9 (1984)
- Thermal and Maser Molecular Lines from the Envelope of IRC + 10216. *Nguyen-Q-Rieu, V. Bujarabab, H. Olofsson, L. E. B. Johansson, and B. E. Turner*. **286**, 276, 125-A1 (1984)
- Star Cloud Turbulence. *R. N. Henriksen and B. E. Turner*. **287**, 200, 135-B5 (1984)
- TURNER, DAVID G. An Investigation of the Stellar Association Containing the 1.95 Day Cepheid SU Cassiopeiae. *David G. Turner and Nancy Remage Evans*. **283**, 254, 88-F13 (1984)
- TURNER, EDWIN L. The Statistics of Gravitational Lenses: The Distributions of Image Angular Separations and Lens Redshifts. *Edwin L. Turner, Jeremiah P. Ostriker, and Richard J. Gott III*. **284**, 1, 98-A6 (1984)
- A Statistical Comparison of Voids in the Galaxy Distribution of n-Body Simulations. *Barbara S. Ryden and Edwin L. Turner*. **287**, L59, 145-C9 (1984)
- TURNER, J. L. Discovery of a Young Stellar Object near the Water Masers in W3(OH). *J. L. Turner and W. J. Welch*. **287**, L81, 145-E6 (1984)
- TURNER, M. S. Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. *J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive*. **281**, 493, 68-A5 (1984)
- TURNER, MICHAEL S. Limits from the Soft X-Ray Background on the Temperature of Old Neutron Stars and on the Flux of Superheavy Magnetic Monopoles. *Edward W. Kolb and Michael S. Turner*. **286**, 702, 130-G2 (1984)
- TURNESHEK, D. A. Observations of Three QSOs with Complex, Broad Absorption Lines. *D. A. Turnshek, R. J. Weymann, R. F. Carswell, and M. G. Smith*. **277**, 51, 11-E1 (1984)
- The Broad Absorption Lines in the Spectrum of the QSO PKS 1157 + 014: A Possible Link between Broad Absorption Line QSOs, Metal Enrichment, and the Formation of Galaxies. *F. H. Briggs, D. A. Turnshek, and A. M. Wolfe*. **287**, 549, 140-B8 (1984)
- TURNESHEK, DAVID A. The Absorption Line Profiles in Q1101-264. *Robert F. Carswell, Donald C. Morton, Malcolm G. Smith, Alan N. Stockton, David A. Turnshek, and Ray J. Weymann*. **278**, 486, 36-C6 (1984)
- New Results on the Formation of Broad Emission Lines in QSOs. *David A. Turnshek*. **278**, L87, 36-A4 (1984)
- Properties of the Broad Absorption-Line QSOs. *David A. Turnshek*. **280**, 51, 49-E6 (1984)
- TURTLE, A. J. Supernova Remnants in the Magellanic Clouds. *D. S. Mathewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle*. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- TURVER, K. E. Evidence for Pulsed 1000 GeV Gamma-Rays from the

- Crab Pulsar. *J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walsmsley.* **286**, L35, 132-D6 (1984)
- TUTUKOV, ALEXANDER V. Cooling of Low-Mass Carbon-Oxygen Dwarfs from the Planetary Nucleus Stage through the Crystallization Stage. *Icko Iben, Jr. and Alexander V. Tutukov.* **282**, 615, 81-F13 (1984)
- Star Formation Histories of Irregular Galaxies. *John S. Gallagher III, Deidre A. Hunter, and Alexander V. Tutukov.* **284**, 544, 105-A12 (1984)
- The Evolution of Low-Mass Close Binaries Influenced by the Radiation of Gravitational Waves and by a Magnetic Stellar Wind. *Icko Iben, Jr. and Alexander V. Tutukov.* **284**, 719, 106-G8 (1984)
- Supernovae of Type I as End Products of the Evolution of Binaries with Components of Moderate Initial Mass ($M \leq 9 M_{\odot}$). *Icko Iben, Jr. and Alexander V. Tutukov.* **54**, 335, 6-A1 (1984) (Abstr. in **276**, 800, 10-B12)
- TYSON, J. ANTHONY. Galaxy Mass Distribution from Gravitational Light Deflection. *J. Anthony Tyson, Francisco Valdes, John F. Jarvis, and Allen P. Mills, Jr.* **281**, L59, 73-A8 (1984)
- TZUR, I. Numerical Investigation of Fluid Models with Full Electron and Proton Thermal Conduction Equations for the Quiet Solar Wind. *S. Cupperman, I. Tzur, and M. Dryer.* **286**, 763, 131-D10 (1984)
- TZUR, ISRAEL. Theoretical Model of the Solar Corona during Sunspot Minimum. I. Quasi-static Approximation. *Vladimir A. Osherovich, Israel Tzur, and Erast B. Gliner.* **284**, 412, 102-D7 (1984)
- UBERTINI, P. Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. *A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda.* **279**, 515, 43-D13 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. *P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda.* **284**, 54, 98-E3 (1984)
- ULMER, M. P. An X-Ray Survey of Clusters of Galaxies. IV. A Survey of Southern Clusters and a Compilation of Upper Limits for Both Abell and Southern Galaxies. *M. P. Kowalski, M. P. Ulmer, R. G. Crude, and K. S. Wood.* **56**, 403, 29-A9 (1984) (Abstr. in **286**, 822, 132-A13)
- ULMSCHNEIDER, P. Apparent Solar Temperature Enhancement due to Large-Amplitude Waves. *W. Kalkofen, P. Ulmschneider, and F. Schmitz.* **287**, 952, 144-E11 (1984)
- ULRICH, M. H. Variability of the Ultraviolet Spectrum of BL Lacertae Objects. *M. H. Ulrich, K. R. H. Hackney, R. L. Hackney, and Y. Kondo.* **276**, 466, 6-F2 (1984)
- ULRICH, MARIE-HELENE. NGC 4650A: The Rotation of the Diffuse Stellar Component. *Paul L. Schechter, Marie-Helene Ulrich, and A. Boksenberg.* **277**, 526, 17-G3 (1984)
- ULRICH, ROGER K. Observations of Diffuse Interstellar Bands toward T Tauri Stars. *David M. Meyer and Roger K. Ulrich.* **283**, 98, 87-B5 (1984)
- ULVESTAD, JAMES S. Radio Structures of Seyfert Galaxies. V. A Flux-Limited Sample of Markarian Galaxies. *James S. Ulvestad and A. S. Wilson.* **278**, 544, 31-G9 (1984)
- Radio Structures of Seyfert Galaxies. VI. VLA Observations of a Nearby Sample. *James S. Ulvestad and A. S. Wilson.* **285**, 435, 116-C5 (1984)
- UNDERHILL, ANNE B. Radio Emission from the Outer Parts of Stellar Atmospheres (Mantles) at Centimeter Wavelengths and the Winds of Early-Type Stars. *Anne B. Underhill.* **276**, 583, 8-A1 (1984)
- Do Bipolar Magnetic Regions Exist on the Surfaces of Early-Type Stars? *Anne B. Underhill and Richard P. Fahey.* **280**, 712, 57-E11 (1984)
- The Ultraviolet Variability of Early-Type Supergiants. *Anne B. Underhill.* **285**, 668, 118-G1 (1984)
- Similar Photospheres, Different Mantles: A Study of Four O Stars. *Anne B. Underhill.* **287**, 874, 143-G3 (1984)
- UNWIN, STEPHEN C. The Sub-Milliarsecond Radio Structure of AO 0235 + 164. *Dayton L. Jones, Lars B. Baath, Michael M. Davis, and Stephen C. Unwin.* **284**, 60, 98-E9 (1984)
- UOMOTO, ALAN. Spectrophotometry of Intermediate-Redshift Quasars. *Alan Uomoto.* **284**, 497, 104-E7 (1984)
- URRY, C. M. Luminosity Enhancement in Relativistic Jets and Altered Luminosity Functions for Beamed Objects. *C. M. Urry and R. A. Shafer.* **280**, 569, 55-A14 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. *S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge.* **285**, 571, 117-G2 (1984)
- USHER, PETER D. A Medium-Bright Quasar Sample: New Quasar Surface Densities in the Magnitude Range $16.4 < B < 17.65$. *Kenneth J. Mitchell, Archibald Warnock III, and Peter D. Usher.* **287**, L3, 138-C5 (1984)
- Faint Blue Objects at High Galactic Latitude. IV. Palomar Schmidt Fields Centered on Selected Areas 55 and 94. *Ke-Liang Huang and Peter D. Usher.* **56**, 393, 28-B1 (1984) (Abstr. in **285**, 875, 121-A6)
- USON, JUAN M. New Limits on Small-Scale Anisotropy in the Microwave Background. *Juan M. Uson and David T. Wilkinson.* **277**, L1, 16-A2 (1984)
- Small-Scale Isotropy of the Cosmic Microwave Background at 19.5 GHz. *Juan M. Uson and David T. Wilkinson.* **283**, 471, 92-A5 (1984)
- UTSUMI, KENICHI. Screening Potential Enhancement of Thermonuclear Reaction Rate due to Relativistic Degenerate Electrons in Dense Multi-ionic Plasmas. *Settsuo Ichimaru and Kenichi Utsumi.* **278**, 382, 28-B5 (1984)
- Enhancement of Thermonuclear Reaction Rate due to Screening by Relativistic Degenerate Electrons: Long-Range Correlation Effect. *Settsuo Ichimaru and Kenichi Utsumi.* **286**, 363, 125-G6 (1984)
- UYEMURA, MASAKATSU. Infrared Pumping for HC_3N in the Circumstellar Envelope of IRC +10216. *Shuji Deguchi and Masakatsu Uyemura.* **285**, 153, 111-E12 (1984)
- UYLINGS, P. H. M. Calculations of Transition Probabilities for Forbidden Lines in the $3d^7$ Ground Configurations of Co III and Ni IV. *J. E. Hansen, A. J. J. Raassen, and P. H. M. Uylings.* **277**, 435, 15-E13 (1984)
- VACCA, WILLIAM D. Precursors to X-Ray Bursts: The Result of Expansion and Subsequent Contraction of the Neutron Star's Photosphere. *Walter H. G. Lewin, William D. Vacca, and Ewa M. Basinska.* **277**, L57, 22-F8 (1984)
- VAIANA, G. S. Einstein Observations of X-Ray Emission from A Stars: Erratum. *L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr.* **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. *F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana.* **281**, 815, 71-D5 (1984)
- VALDES, FRANCISCO. Galaxy Mass Distribution from Gravitational Light Deflection. *J. Anthony Tyson, Francisco Valdes, John F. Jarvis, and Allen P. Mills, Jr.* **281**, L59, 73-A8 (1984)
- VAN ALBADA, T. S. Gravitational Imaging by Superclusters. *R. H. Sanders, T. S. van Albada, and T. A. Oosterloo.* **278**, L91, 36-A8 (1984)
- VAN BREUGEL, W. J. M. Emission-Line Gas Associated with the Radio Lobes of the High-Luminosity Radio Source 3C 171. *T. M. Heckman, W. J. M. van Breugel, and G. K. Miley.* **286**, 509, 128-F5 (1984)
- VAN BREUGEL, WIL. Optical Line Emission Associated with the Radio Galaxy 4C 26.42 in the Cluster of Galaxies Abell 1795. *Wil van Breugel, Timothy Heckman, and George Miley.* **276**, 79, 1-F14 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley.* **277**, 82, 11-G5 (1984)
- Is 3C 310 Blowing Bubbles? *Wil van Breugel and E. B. Fomalont.* **282**, L55, 85-A11 (1984)
- VAN BUREN, DAVE. Photoionized Stellar Wind Bubbles in a Cloudy Medium. *Christopher F. McKee, Dave Van Buren, and Bernard Lazareff.* **278**, L115, 36-C3 (1984)
- VAN DAM, H. Spacetime Thermodynamics and the Inflationary Universe. *T. W. Kephart, Y. J. Ng, and H. van Dam.* **277**, 478, 17-C10 (1984)
- VAN DE BULT, C. E. P. 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult.* **276**, 533, 7-D4 (1984)
- VANDENBERG, DON A. Theoretical Zero-Age Main Sequences Applied to the Pleiades, Praesepe, and Hyades Star Clusters. *Don A. Vandenberg and Terry J. Bridges.* **278**, 679, 33-C14 (1984)
- VAN DEN BERGH, SIDNEY. The NGC 5128 Globular Cluster System. *James E. Hesser, Hugh C. Harris, Sidney van den Bergh, and Gretchen L. H. Harris.* **276**, 491, 7-A1 (1984)
- The Expansion Age of the Supernova Remnant RCW 89 = MSH 15 - 52 (G320.4 - 1.2). *Sidney van den Bergh and Karl W. Kamper.* **280**, L51, 60-E1 (1984)
- Does the Ellipticity of Clusters in the LMC Correlate with Age or Luminosity? *Sidney van den Bergh and Christopher L. Morbey.* **283**, 598, 93-D11 (1984)
- VANDEN BOUT, P. A. Observations of Narrow Diffuse Interstellar Bands toward Stars with Low Reddening. *S. R. Federman, C. K. Kumar, and P. A. Vanden Bout.* **282**, 485, 80-D9 (1984)
- VAN DER KRUIT, P. C. The Vertical Velocity Dispersion of the Stars in the Disks of Two Spiral Galaxies. *P. C. van der Kruit and K. C. Freeman.* **278**, 81, 24-G11 (1984)
- VANDERSPEK, ROLAND. An Intercontinental Baseline Coincidence Search for Optical Flashes with Two Schmidt Telescopes. *Bradley E. Schaefer, Roland Vanderspek, Hale V. Bradt, and George R. Ricker.* **283**, 887, 96-E8 (1984)

- VANDERVOORT, PETER O. On Schwarzschild's Method for the Construction of Model Galaxies. *Peter O. Vandervoort*. **287**, 475, 139-D1 (1984)
- VANDERWYCK, A. H. B. Diffraction-limited Spatial Resolution of Circumstellar Dust Shells at 10 Microns. *E. E. Bloemhof, C. H. Townes, and A. H. B. Vanderwyck*. **276**, L21, 5-F10 (1984)
- VAN DISHOECK, EWINE F. Photodissociation of OH in Interstellar Clouds. *Ewine F. van Dishoeck and A. Dalgarno*. **277**, 576, 18-C12 (1984)
- VAN DUINEN, R. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- IRAS Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius*. **278**, L33, 29-E7 (1984)
- VAN HORN, H. M. Electromagnetic Damping of Neutron Star Oscillations. *P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen*. **281**, 746, 70-F2 (1984)
- VAN HOVEN, G. Radiative Tearing: Magnetic Reconnection on a Fast Thermal Instability Time Scale. *R. S. Steinolfson and G. Van Hoven*. **276**, 391, 5-A13 (1984)
- Radiative and Reconnection Instabilities: Filaments and Flares. *G. Van Hoven, T. Tachi, and R. S. Steinolfson*. **280**, 391, 53-B13 (1984)
- The Thermal Instability in a Sheared Magnetic Field: Filament Condensation with Anisotropic Heat Conduction. *G. Van Hoven and Y. Mok*. **282**, 267, 76-G1 (1984)
- VAN PARADIJS, J. Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. *M. Matsuoka, K. Mitsuuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsumo, S. Miyamoto, H. Tsumemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs*. **283**, 774, 95-D3 (1984)
- VAN SPEYBROECK, L. P. Optical Counterparts for X-Ray Sources in M31. *D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck*. **284**, 663, 106-C8 (1984)
- VAUGHAN, A. H. An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. *L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan*. **276**, 254, 3-E12 (1984)
- Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. *R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan*. **279**, 763, 46-B8 (1984)
- VAUGHAN, ARTHUR H. The Relation between Stellar Rotation Rate and Activity Cycle Periods. *Robert W. Noyes, Nigel O. Weiss, and Arthur H. Vaughan*. **287**, 769, 142-F6 (1984)
- VEDRENNE, G. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt*. **280**, 150, 50-E14 (1984)
- On the Morphology and Spectra of the Short Gamma-Ray Bursts. *C. Barat, R. I. Hayles, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zenchenko*. **285**, 791, 120-B3 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilovaisky, and C. Motch*. **286**, L5, 126-D7 (1984)
- Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolidze*. **286**, L11, 126-D14 (1984)
- Three Precise Gamma-Ray Burst Source Locations. *T. L. Cline, U. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer*. **286**, L15, 126-F3 (1984)
- VENKATESAN, D. Estimate of Cosmic-Ray Latitudinal Gradient in 1981-1982. *R. B. Decker, S. M. Krimigis, and D. Venkatesan*. **278**, L119, 36-C7 (1984)
- A Study of the Spectra and Pulse Profiles of Centaurus X-3 from *Hakuchō, R. Lieu, D. Venkatesan, and K. Mitani*. **282**, 709, 82-F14 (1984)
- VIGROUX, L. Temperature and Elemental Abundances in the Abell Cluster A576 Derived from X-Ray Observations. *R. Rothenflug, L. Vigroux, R. F. Mushotzky, and S. S. Holt*. **279**, 53, 37-E6 (1984)
- VIGROUX, LAURENT. An Identification for "Gemina" (2CG 195 + 04): The Optical Counterpart of 1E 0630 + 178, A Unique Object in the Gamma-Ray Source Error Box. *Patrizia A. Caraveo, Giovanni F. Bignami, Laurent Vigroux, and Jacques A. Paul*. **276**, L45, 10-F2 (1984)
- VILENKIN, ALEXANDER. Cosmic Strings as Gravitational Lenses. *Alexander Vilenkin*. **282**, L51, 85-A8 (1984)
- VILLENEUVE, B. Carbon in the Cool DC and C₂ White Dwarfs: Dredge-up in Compositionally Stratified Envelopes. *G. Fontaine, B. Villeneuve, F. Wesemael, and G. Wegner*. **277**, L61, 22-F12 (1984)
- VILLUMSEN, JENS VERNER. Violent Relaxation and Dissipationless Collapse. *Jens Verner Villumsen*. **284**, 75, 98-F11 (1984)
- VINER, M. R. Extended Radio Observations of the SNR CTB 109. *V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner*. **283**, 147, 87-F1 (1984)
- VIOTTI, R. IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. *R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung*. **283**, 226, 88-D13 (1984)
- VISVANATHAN, N. The Magnetic Field of the AM Herculis Object H0139-68. *D. T. Wickramasinghe, N. Visvanathan, and I. R. Tuohy*. **286**, 328, 125-D13 (1984)
- VITELLO, PETER. Optically Thick, Time-dependent Spherical Accretion onto a Black Hole. I. Equations and Numerical Methods. *Peter Vitello*. **284**, 394, 102-C3 (1984)
- VITTORIO, NICOLA. Fine-Scale Anisotropy of the Cosmic Microwave Background in a Universe Dominated by Cold Dark Matter. *Nicola Vittorio and Joseph Silk*. **285**, L39, 121-C8 (1984)
- VLAHOS, LOUKAS. Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. *R. R. Sharma and Loukas Vlahos*. **280**, 405, 53-D1 (1984)
- VOGEL, S. N. Interaction of the Outflow and Quiescent Gas in Orion: HCO⁺ Aperture Synthesis Maps. *S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch*. **283**, 655, 94-B2 (1984)
- VOGT, R. E. Elemental Composition of Solar Energetic Particles. *W. R. Cook, E. C. Stone, and R. E. Vogt*. **279**, 827, 46-G3 (1984)
- VOLK, H. J. Transport of Dust and Vapor and Chemical Fractionation in the Early Protosolar Cloud. *G. E. Morfill and H. J. Volk*. **287**, 371, 137-A7 (1984)
- VRBA, F. J. The Ratio of Total to Selective Extinction in the Chamaeleon TI and R Coronae Australis Dark Clouds. *F. J. Vrba and A. E. Rydgren*. **283**, 123, 87-D2 (1984)
- VRTILEK, J. M. The Dynamics of the Narrow Line Regions of Seyfert Galaxies. *Julian H. Krolik and J. M. Vrtilek*. **279**, 521, 43-E5 (1984)
- WADA, SETSUKO. Infrared Spectrum of the Laboratory-Synthesized Quenched Carbonaceous Composite (QCC): Comparison with the Infrared Unidentified Emission Bands. *Akira Sakata, Setsuko Wada, Toshihiko Tanabé, and Takashi Onaka*. **287**, L51, 138-F9 (1984)
- WADE, RICHARD. Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin*. **284**, 118, 99-D1 (1984)
- WAGNER, JEREMY. Oscillator Strengths of the C₂ A¹Π_g-X¹Σ_g⁺ Phillips System. *Sumner P. Davis, Wm. Hayden Smith, James W. Brault, Rubén Pecnyer, and Jeremy Wagner*. **287**, 455, 137-G7 (1984)
- WAGONER, ROBERT V. Gravitational Radiation from Accreting Neutron Stars. *Robert V. Wagoner*. **278**, 345, 27-F9 (1984)
- WAHLQUIST, HUGO D. IUE Observations of High-Redshift Quasars. *Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman*. **281**, 76, 61-F12 (1984)
- WAKAMATSU, KEN-ICHI. A Surface Photometry of Edge-on Galaxies. V. The Vertical Structure of the Bar in NGC 4762. *Ken-ichi Wakamatsu and Masaru Hamabe*. **56**, 283, 26-B3 (1984) (Abstr. in **284**, 870, 108-E2)
- WALBORN, NOLAN R. The High-Ionization and Excited-State Interstellar Lines in the Carina Nebula: A Giant H II Region in Absorption. *Nolan R. Walborn, Joy N. Heckathorn, and James E. Hesser*. **276**, 524, 7-C9 (1984)
- Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si IV Stellar Wind Effect. *Nolan R. Walborn and Robert J. Panek*. **280**, L27, 54-E3 (1984)
- Ultraviolet Spectral Morphology of the O Stars. II. The Main Sequence. *Nolan R. Walborn and Robert J. Panek*. **286**, 718, 131-A4 (1984)
- WALDRON, WAYNE L. Recombination Stellar Wind Model for the Coronae of Early-Type Stars. *Wayne L. Waldron*. **282**, 256, 75-F4 (1984)

- WALKER, MERLE F. On the Existence of a Dark Halo around the High-Velocity Compact Object near NGC 1199. *Merle F. Walker and Johannes Andersen*. **287**, 148, 134-E5 (1984)
- WALKER, R. C. H₂O in W49N. II. Statistical Studies of Hyperfine Structure, Clustering, and Velocity Distributions. *R. C. Walker*. **280**, 618, 56-E10 (1984)
- Ultracompact Structure in the H II Region W49N. *J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker*. **283**, 632, 93-G6 (1984)
- WALKER, R. G. The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. *M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker*. **278**, L7, 29-C9 (1984)
- Observations of Comet IRAS-Araki-Alcock 1983d. *R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer*. **278**, L11, 29-C14 (1984)
- IRAS Observations of the Diffuse Infrared Background. *M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker*. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius*. **278**, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. *H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius*. **278**, L23, 29-D12 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. *J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker*. **278**, L63, 30-A7 (1984)
- WALL, J. V. Limits to the Small-Scale Fluctuations in the Cosmic Background Radiation. *E. B. Fomalont, K. I. Kellermann, and J. V. Wall*. **277**, L23, 22-D4 (1984)
- WALLERSTEIN, GEORGE. High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. *Edward B. Jenkins, George Wallerstein, and Joseph Silk*. **278**, 649, 33-A12 (1984)
- Did the First Metals in Our Galaxy Come from Virgo Cluster Supernovae? *George Wallerstein*. **278**, 663, 33-B12 (1984)
- WALMSLEY, C. M. The Relative Abundances of Cyanogenated Molecules. *E. Churchwell, A. G. Nash, and C. M. Walmsley*. **287**, 681, 141-F9 (1984)
- WALMSLEY, M. Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. *J. C. Douthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turner, and M. Walmsley*. **286**, L35, 132-D6 (1984)
- WALSER, D. Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^\circ$ to $l = +62^\circ$: Structure and Energetics of the Inner Disk. *M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung*. **285**, 74, 110-F14 (1984)
- WALTER, F. M. Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. *F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana*. **281**, 815, 71-D5 (1984)
- X-Ray Photometry and Spectroscopy of T Tauri Stars. *F. M. Walter and L. V. Kuhi*. **284**, 194, 100-B12 (1984)
- WALTMAN, E. B. Rapid Radio Variations in the Flux Density of BL Lacertae. *K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Jostes, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis*. **277**, L30, 22-D11 (1984)
- WAMPLER, E. JOSEPH. Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. *E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin*. **276**, 403, 6-A5 (1984)
- WANDEL, A. Nonadiabatic Self-consistent Spherical Accretion as a Model for Quasars and Active Galactic Nuclei. *A. Wandel, A. Yahil, and M. Milgrom*. **282**, 53, 74-E4 (1984)
- WANG, J. L. Hard X-Ray Imaging of a Solar Two-Ribbon Flare on 1981 August 21. *T. Takakura, K. Ohki, N. Nitta, and J. L. Wang*. **281**, L51, 67-A5 (1984)
- WANG, JIEH-SHAN. Collisional Excitation Rate Coefficients for Fe XI. *Jieh-Shan Wang, Arny Marotta, and Raju U. Datla*. **279**, 460, 42-A8 (1984)
- WANG, Z. R. X-Rays from the SNR 3C 391. *Z. R. Wang and F. D. Seward*. **279**, 705, 45-E4 (1984)
- An X-Ray Investigation of the Unusual Supernova Remnant CTB 80. *Z. R. Wang and F. D. Seward*. **285**, 607, 118-B10 (1984)
- WANG, ZHENGZHI. Linear Astrophysical Dynamos in Rotating Spheres: Differential Rotation, Anisotropic Turbulent Magnetic Diffusivity, and Solar-Stellar Cycle Magnetic Parity. *Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu*. **280**, 865, 59-C3 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Solar and Stellar Cycle North-South Hemispheric Parity Selection Mechanism and Turbulent Magnetic Diffusivity. *Hirokazu Yoshimura, Fei Wu, and Zhengzhi Wang*. **285**, 325, 113-D9 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Mode Transition between Steady and Oscillatory Dynamos as a Function of Dynamo Strength and Anisotropic Turbulent Magnetic Diffusivity. *Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu*. **283**, 870, 96-D5 (1984)
- WANNIER, P. G. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. *C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. *M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **285**, L79, 121-G2 (1984)
- WARD, MARTIN. 1-20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward*. **280**, 514, 56-B5 (1984)
- WARDLE, J. F. C. The Radio Morphology of Blazars and Relationships to Optical Polarization and to Normal Radio Galaxies. *J. F. C. Wardle, Richard L. Moore, and J. R. P. Angel*. **279**, 93, 38-A9 (1984)
- WARNER, BRIAN. Observations of Quasi-periodic Oscillations in the Light Curve of VW Hydr. *Edward L. Robinson and Brian Warner*. **277**, 250, 13-E14 (1984)
- WARNOCK, ARCHIBALD, III. A Medium-Bright Quasar Sample: New Quasar Surface Densities in the Magnitude Range $16.4 < B < 17.65$. *Kenneth J. Mitchell, Archibald Warnock III, and Peter D. Usher*. **287**, L3, 138-C5 (1984)
- WARWICK, R. S. Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. *J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock*. **280**, 688, 57-C14 (1984)
- WASSERBAECH, S. Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. *J. Boone, R. Cady, G. L. Cassidy, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech*. **285**, 264, 112-G1 (1984)
- WASSERMAN, I. Constraints on the Progenitor Binary System for PSR 1913 + 16. *J. M. Cordes and I. Wasserman*. **279**, 798, 46-E2 (1984)
- WASSERMAN, IRA. Neutrino Emissivity of Interacting Quark Matter in Neutron Stars. II. Finite Neutrino Momentum Effects. *Robert C. Duncan, Stuart L. Shapiro, and Ira Wasserman*. **278**, 806, 34-F6 (1984)
- Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. *Rida Farouki, Stuart L. Shapiro, and Ira Wasserman*. **284**, 282, 101-B3 (1984)
- WATANABE, M. Digital Surface Photometry of Galaxies toward a Quantitative Classification. III. A Mean Concentration Index as a Parameter Representing the Luminosity Distribution. *S. Okamura, K. Kodaira, and M. Watanabe*. **280**, 7, 49-A13 (1984)
- WATANABE, TETSUYA. Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300-2000 Å). *Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi*. **280**, 213, 51-D1 (1984)
- Solar Flare Iron K α Emission Associated with a Hard X-Ray Burst. *Katsuo Tanaka, Tetsuya Watanabe, and Nariaki Nitta*. **282**, 793, 83-F8 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130-200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. *Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira*. **287**, 359, 136-G7 (1984)
- WATSON, DAN M. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. *R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey*. **276**, 551, 7-E9 (1984)
- Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. *Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and*

- J. W. V. Storey. **279**, L1, 42-D3 (1984)
- Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson. **282**, L81, 85-C12 (1984)
- WATSON, M. G. Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock. **280**, 688, 57-C14 (1984)
- X-Ray Emission from M82. M. G. Watson, V. Stanger, and R. E. Griffiths. **286**, 144, 123-D12 (1984)
- WATSON, W. D. Theory of Astrophysical SiO Masers. S. H. Langer and W. D. Watson. **284**, 751, 107-C1 (1984)
- Linear Polarization of Astronomical Masers and Magnetic Fields. L. R. Western and W. D. Watson. **285**, 158, 111-F3 (1984)
- Quantal Calculations of Charge Transfer in Collisions between N v and Atomic Hydrogen. C. A. Feickert, R. J. Blint, G. T. Surratt, and W. D. Watson. **286**, 371, 126-A1 (1984)
- WATSON, WILLIAM D. The Spin Temperature of Atomic Hydrogen in Very Low Density Gas outside of Galaxies. William D. Watson and Shuji Deguchi. **281**, L5, 65-E6 (1984)
- Linear Polarization of Molecular Lines at Radio Frequencies. Shuji Deguchi and William D. Watson. **285**, 126, 111-C12 (1984)
- WEATHERALL, JAMES. Turbulent Heating in Solar Cosmic-Ray Theory. James Weatherall. **281**, 468, 66-A11 (1984)
- WEAVER, H. A. Infrared Molecular Emissions from Comets. H. A. Weaver and M. J. Mumma. **276**, 782, 10-A8 (1984)
- Vibrational and Rotational Excitation of CO in Comets: Nonequilibrium Calculations. G. Chin and H. A. Weaver. **285**, 858, 120-G2 (1984)
- Infrared Molecular Emissions from Comets: Erratum. H. A. Weaver and M. J. Mumma. **285**, 872, 121-A3 (1984) (Orig. paper in **276**, 782, 10-A8)
- WEAVER, WM. BRUCE. A Paradoxical Gap in the Relative Ages of T Tauri Stars. Wm. Bruce Weaver. **282**, 688, 82-E6 (1984)
- WEBB, DOUGLAS A. Reevaluation of the Rate Constants for the Reactions $C^+ + H_2 \rightarrow CH^+ + H$ and $CH^+ + H \rightarrow C^+ + H_2$ at Temperatures Characteristic of Ambient and Shocked Diffuse Interstellar Clouds. Walter J. Chesnavich, Victor E. Akin, and Douglas A. Webb. **287**, 676, 141-F3 (1984)
- WEBB, J. Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- WEBB, J. R. Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- WEBBER, JOHN C. Detection of a Sub-Milliarcsecond Radio Component in the RS CVn System 1099. Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston. **282**, L23, 78-B12 (1984)
- WEBBER, W. R. Integral Radial Cosmic Ray Gradients in the Solar System from 1972 to 1982. J. A. Lockwood and W. R. Webber. **279**, 151, 38-E13 (1984)
- Evidence that the Anomalous Cosmic-Ray Component is Singly Ionized. A. C. Cummings, E. C. Stone, and W. R. Webber. **287**, L99, 145-F8 (1984)
- WEBBINK, R. F. Double White Dwarfs as Progenitors of R Coronae Borealis Stars and Type I Supernovae. R. F. Webbink. **277**, 355, 14-F12 (1984)
- WEBBINK, RONALD F. The Nature of Symbiotic Stars. Scott J. Kenyon and Ronald F. Webbink. **279**, 252, 39-F14 (1984)
- WEEKES, T. CCD Brightness Monitoring of the Twin QSO 0957 + 561. R. E. Schild and T. Weekes. **277**, 481, 17-C13 (1984)
- WEFEL, J. P. The Path-Length Distribution for Galactic Cosmic-Ray Propagation: An Energy-Dependent Depletion of Short Path Lengths. M. Garcia-Munoz, T. G. Guzik, J. A. Simpson, and J. P. Wefel. **280**, L13, 54-D4 (1984)
- WEGNER, G. GD 323: A White Dwarf with a Stratified H/He Atmosphere? James Liebert, F. Wesemael, E. M. Sion, and G. Wegner. **277**, 692, 19-F3 (1984)
- Carbon in the Cool DC and C₂ White Dwarfs: Dredge-up in Compositionally Stratified Envelopes. G. Fontaine, B. Villeneuve, F. Wesemael, and G. Wegner. **277**, L61, 22-F12 (1984)
- Analyses of the Visual Spectra of White Dwarfs Containing Carbon. G. Wegner and F. H. Yackovitch. **284**, 257, 100-G6 (1984)
- WEGNER, GARY. The Discontinuity near 1600 Å in the Spectra of DA White Dwarfs. Gary Wegner. **284**, L43, 109-B13 (1984)
- WEHINGER, P. A. Host Galaxies of Quasars and Their Association with Galaxy Clusters. T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff. **278**, 11, 24-B2 (1984)
- WEHLAU, WILLIAM H. Asymmetries in the Spectral Lines of Procyon and κ Cancri. John B. Rice and William H. Wehlau. **278**, 721, 33-G1 (1984)
- WEHRLE, ANN E. A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Ruis. **284**, 519, 104-G1 (1984)
- WEIDEMANN, V. Temperatures and Surface Gravities of DB White Dwarfs. J. B. Oke, V. Weidemann, and D. Koester. **281**, 276, 64-A1 (1984)
- WEILER, E. J. Abundance of Interstellar Aluminum. E. S. Barker, P. M. Lugger, E. J. Weiler, and D. G. York. **280**, 600, 56-D5 (1984)
- WEILER, K. W. Radio Emission from a Type I Supernova: SN 1983.51 in NGC 5236. R. A. Sramek, N. Panagia, and K. W. Weiler. **285**, L59, 121-E2 (1984)
- WEILER, T. Big Bang Cosmology, Relic Neutrinos, and Absorption of Neutrino Cosmic Rays. T. Weiler. **285**, 495, 116-G12 (1984)
- WEINBERG, MARTIN D. A Kinematic Method for Measuring the Pattern Speed of Barred Galaxies. Scott Tremaine and Martin D. Weinberg. **282**, L5, 78-A6 (1984)
- WEIS, EDWARD W. Photometric Parallaxes for Selected Stars of Color Class m from the NLTT Catalog. Edward W. Weis. **55**, 289, 15-A3 (1984) (Abstr. in **280**, 940, 60-B4)
- WEISBERG, J. M. Pulsar Polarization Fluctuations. I. 1404 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, Joanna M. Rankin, J. M. Weisberg, and Valentin Boriakoff. **55**, 247, 14-D9 (1984) (Abstr. in **280**, 939, 60-B3)
- Pulsar Polarization Fluctuations. II. 800 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, J. M. Weisberg, Joanna M. Rankin, and Valentin Boriakoff. **55**, 279, 14-G7 (1984) (Abstr. in **280**, 939, 60-B3)
- WEISS, NIGEL O. The Relation between Stellar Rotation Rate and Activity Cycle Periods. Robert W. Noyes, Nigel O. Weiss, and Arthur H. Vaughan. **287**, 769, 142-F6 (1984)
- WEISSKOPF, M. C. Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Darbro. **276**, 691, 9-B1 (1984)
- The Central X-Ray Source in SS 433. J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall. **277**, 286, 14-A13 (1984)
- X-Ray Observations of X Persei. M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Narayan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland. **278**, 711, 33-F5 (1984)
- WEISSKOPF, V. J. X-Ray Observations of X Persei. M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Narayan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland. **278**, 711, 33-F5 (1984)
- WELCH, D. L. JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. McAlary, R. McGonegal, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- WELCH, W. J. Ultracompact Structure in the H II Region W49N. J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker. **283**, 632, 93-G6 (1984)
- Interaction of the Outflow and Quiescent Gas in Orion: HCO⁺ Aperture Synthesis Maps. S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch. **283**, 655, 94-B2 (1984)
- The Distribution of HCN in the Circumstellar Envelope of IRC + 10216. J. H. Bieging, B. Chapman, and W. J. Welch. **285**, 656, 118-F3 (1984)
- Discovery of a Young Stellar Object near the Water Masers in W3(OH). J. L. Turner and W. J. Welch. **287**, L81, 145-E6 (1984)
- WELLER, CHARLES S. Observations of the Stellar Radiation Field at 975 Å. Chet B. Opal and Charles S. Weller. **282**, 445, 80-A10 (1984)
- WELTER, G. L. The Rotation Measure Distribution of QSOs and of Intervening Clouds: Magnetic Fields and Column Densities. G. L. Welter, J. J. Perry, and P. P. Kronberg. **279**, 19, 37-B11 (1984)
- WERNER, M. Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey. **276**, 551, 7-E9 (1984)
- WERNER, M. W. Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and J. W. V. Storey. **279**, L1, 42-D3 (1984)
- Observations of the Brightness Profile of the Sun in the 30–200 Micron Continuum. C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley. **281**, 862, 71-G11 (1984)
- Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson. **282**, L81, 85-C12 (1984)
- WESEMAEL, F. GD 323: A White Dwarf with a Stratified H/He Atmo-

- sphere? James Liebert, F. Wesemael, E. M. Sion, and G. Wegner. 277, 692, 19-F3 (1984)
- Carbon in the Cool DC and C₂ White Dwarfs: Dredge-up in Compositionally Stratified Envelopes. G. Fontaine, B. Villeneuve, F. Wesemael, and G. Wegner. 277, L61, 22-F12 (1984)
- Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman. 278, 255, 26-F11 (1984)
- IUE Spectrophotometry of the DA4 Primary in the Short-Period White Dwarf-Red Dwarf Spectroscopic Binary Case 1. E. M. Sion, F. Wesemael, and E. F. Guinan. 279, 758, 46-B3 (1984)
- The Close Binary Central Star of the Planetary Nebula Abell 41: A Helium-rich Subdwarf Primary. Richard F. Green, James Liebert, and F. Wesemael. 280, 177, 51-A1 (1984)
- The Far-Ultraviolet Energy Distribution of Sirius B from Voyager 2. J. B. Holberg, F. Wesemael, and I. Hebeiny. 280, 679, 57-C5 (1984)
- Metal Abundances in the Hot DA White Dwarfs Wolf 1346 and Feige 24. F. Wesemael, R. B. C. Henry, and H. L. Shipman. 287, 868, 143-F11 (1984)
- WESSELIUS, P. R. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. 278, L1, 29-C3 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. 278, L19, 29-D8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. 278, L23, 29-D12 (1984)
- IRAS Spectra of Planetary Nebulae. S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius. 278, L33, 29-E7 (1984)
- IRAS Observations of Two Early-Type Pre-Main-Sequence Stars in the Association Chamaeleon I. P. R. Wesselius, D. A. Beintema, and F. M. Olmon. 278, L37, 29-E10 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46-47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. 278, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. 278, L53, 29-F12 (1984)
- WEST, MICHAEL J. Alignments of Clusters of Galaxies as a Probe for Superclusters. Avishai Dekel, Michael J. West, and Sverre J. Aarseth. 279, 1, 37-A6 (1984)
- The Globular Cluster System of the Galaxy. III. Measurements of Radial Velocity and Metallicity for 60 Clusters and a Compilation of Metallicities for 121 Clusters. Robert Zinn and Michael J. West. 55, 45, 11-D4 (1984) (Abstr. in 279, 910, 47-G1)
- WESTERN, L. R. Linear Polarization of Astronomical Masers and Magnetic Fields. L. R. Western and W. D. Watson. 285, 158, 111-F3 (1984)
- WEYMANN, R. J. Observations of Three QSOs with Complex, Broad Absorption Lines. D. A. Turnshek, R. J. Weymann, R. F. Carswell, and M. G. Smith. 277, 51, 11-E1 (1984)
- The Radio Properties of the Broad Absorption-Line Quasars. J. T. Stocke, C. B. Foltz, R. J. Weymann, and W. A. Christiansen. 280, 476, 55-B2 (1984)
- WEYMANN, RAY J. The Absorption Line Profiles in Q1101-264. Robert F. Carswell, Donald C. Morton, Malcolm G. Smith, Alan N. Stockton, David A. Turnshek, and Ray J. Weymann. 278, 486, 36-C6 (1984)
- IUE Observations of High-Redshift Quasars. Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman. 281, 76, 61-F12 (1984)
- Improved Lower Limits on Lyman-Alpha Forest Cloud Dimensions and Additional Evidence Supporting the Gravitational Lens Nature of 2345 + 007A,B. Craig B. Foltz, Ray J. Weymann, Hermann-Josef Röser, and Frederic H. Chaffee, Jr. 281, L1, 65-E2 (1984)
- WHEATON, W. A. The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. 54, 581, 9-G12 (1984) (Abstr. in 278, 896, 35-E14)
- WHEATON, WILLIAM A. Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the HEAO 3 Gamma-Ray Spectrometer. Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson. 281, 566, 68-F8 (1984)
- WHEATON, WM. A. HEAO 3 Discovery of ²⁶Al in the Interstellar Medium. W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson. 286, 578, 129-D14 (1984)
- WHEELER, J. C. Explosive Nucleosynthesis of Type I Supernovae. K. Nomoto, F.-K. Thielemann, and J. C. Wheeler. 279, L23, 42-E9 (1984)
- Explosive Nucleosynthesis and Type I Supernovae: Erratum. K. Nomoto, F.-K. Thielemann, and J. C. Wheeler. 283, L25, 91-F12 (1984) (Orig. paper in 279, L23, 42-E9)
- The Vertical Structure and Stability of Alpha Model Accretion Disks. J. K. Cannizzo and J. C. Wheeler. 55, 367, 16-A2 (1984) (Abstr. in 281, 890, 72-C3)
- WHEELER, J. CRAIG. Models for Type I Supernovae: Partially Incinerated White Dwarfs. Peter G. Sutherland and J. Craig Wheeler. 280, 282, 52-B2 (1984)
- Very Nonadiabatic Radial Pulsations in Luminous Helium Stars. Hideyuki Saio, J. Craig Wheeler, and John P. Cox. 281, 318, 64-D4 (1984)
- WHITAKER, RODNEY W. Radiatively Driven Dust-bounded Implosion: Formation and Stability of Dense Globules. Maxwell T. Sandford II, Rodney W. Whitaker, and Richard I. Klein. 282, 178, 75-G10 (1984)
- WHITE, N. E. MXB 1916 - 053/4U 1915 - 05: Burst Properties and Constraints on a 50 Minute Binary Secondary. J. H. Swank, R. E. Taam, and N. E. White. 277, 274, 14-A1 (1984)
- X-Ray Observations of X Persei. M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Naranan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland. 278, 711, 33-F5 (1984)
- VV Puppis: The Soft X-Ray Machine. Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White. 279, 785, 46-D3 (1984)
- The Unusually Soft X-Ray Spectrum of LMC X-3. N. E. White and F. E. Marshall. 281, 354, 64-G1 (1984)
- Evidence for 4.4 Hour Periodic Dips in the X-Ray Flux from 4U 1755-33. N. E. White, A. N. Parmar, M. Sztajno, H. U. Zimmermann, K. O. Mason, and S. M. Kahn. 283, L9, 91-E11 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Prado, N. E. White, K. S. Wood, and D. J. Yentis. 283, L53, 97-C2 (1984)
- The 41.5 Day Binary X-Ray Pulsar 4U 1223 - 62 (GX 301 - 2). N. E. White and J. H. Swank. 287, 856, 143-E13 (1984)
- WHITE, O. R. The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston. 282, 776, 83-E3 (1984)
- WHITE, RAYMOND E., III. Infall in Elliptical Galaxies. Raymond E. White III and Roger A. Chevalier. 280, 561, 56-A6 (1984)
- WHITE, RICHARD E. Interstellar Matter near the Pleiades. I. Optical Absorption-Line Observations and Foreground Atomic Gas. Richard E. White. 284, 685, 106-E2 (1984)
- Interstellar Matter near the Pleiades. II. CH Formation. Richard E. White. 284, 695, 106-E12 (1984)
- WHITE, RICHARD L. Bipolar Reflection Nebulae: Monte Carlo Simulations. F. Yusef-Zadeh, Mark Morris, and Richard L. White. 278, 186, 26-A11 (1984)
- WHITE, SIMON D. M. Angular Momentum Growth in Protogalaxies. Simon D. M. White. 286, 38, 122-C14 (1984)
- WHITEOAK, J. B. The Distribution of CO in the Galaxy for Longitudes 294° to 86°. B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scofield, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon. 283, L31, 97-A8 (1984)
- WHITMIRE, DANIEL P. Conservative Mass Transfer. II. The Effective Perturbing Force: Equations of Motion for the Eccentricity and Orbital Period. John J. Matese and Daniel P. Whitmire. 282, 522, 80-G4 (1984)
- WHITMORE, BRADLEY C. An Objective Classification System for Spiral Galaxies. I. The Two Dominant Dimensions. Bradley C. Whitmore. 278, 61, 24-F3 (1984)
- Luminosity-dependent Line Ratios in Disks of Spiral Galaxies. Vera C. Rubin, W. Kent Ford, Jr., and Bradley C. Whitmore. 281, L21, 65-F6 (1984)
- Stellar and Gas Kinematics in Disk Galaxies. Bradley C. Whitmore, Vera C. Rubin, and W. Kent Ford, Jr. 287, 66, 133-F3 (1984)
- WHITNEY, A. R. The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth. 279, 116,

- 38-C3 (1984)
 The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney*. **287**, 538, 140-A11 (1984)
- WHITNEY, CHARLES A. Departures from Thermal Equilibrium in Expanding Stars. *Charles A. Whitney*. **278**, 310, 27-D2 (1984)
 Stellar Acoustics. II. Pulse Resonance in Giant Star Models. *Toshiki Aikawa and Charles A. Whitney*. **282**, 527, 80-G9 (1984)
- WICKRAMASINGHE, D. T. Polarization Angle in Magnetic White Dwarfs. *Brian Martin and D. T. Wickramasinghe*. **283**, 782, 95-D11 (1984)
 The Magnetic Field of the AM Herculis Object H0139-68. *D. T. Wickramasinghe, N. Viswanathan, and I. R. Tuohy*. **286**, 328, 125-D13 (1984)
- WIDING, KENNETH A. Skylab Flare Associated with a Hard X-Ray Burst. *Kenneth Widing and Eijiro Hiei*. **281**, 426, 65-E4 (1984)
- WIDROW, L. Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. *R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow*. **285**, L23, 114-G8 (1984)
- WIEHL, HERBERT J. Decimetric Gyrosynchrotron Emission during a Solar Flare. *David A. Batchelor, Arnold O. Benz, and Herbert J. Wiehl*. **280**, 879, 59-D3 (1984)
- WIELAND, F. JHK Observations of Classical Cepheids. *D. L. Welch, F. Wieland, C. W. McAlary, R. McGonagall, B. F. Madore, R. A. McLaren, and G. Neugebauer*. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- WIESCHER, M. On the Thermonuclear Origin of the Gamma-Rays from SS 433. *R. N. Boyd, M. Wiescher, G. H. Newsom, and G. W. Collins II*. **276**, L9, 5-E9 (1984)
- WITTA, PAUL J. Local Stability of Thick Accretion Disks. I. Basic Equations and Parallel Perturbations in the Negligible Viscosity Case. *Marek A. Abramowicz, Mario Livio, Tsvi Piran, and Paul J. Witta*. **279**, 367, 41-A6 (1984)
- WILCOX, THOMAS J. The Space Orientation of Stars. *Laurance R. Doyle, Thomas J. Wilcox, and Jean J. Loree*. **287**, 307, 136-C10 (1984)
- WILKING, B. A. The Formation of Massive Stars along the W5 Ionization Front. *B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering*. **279**, 291, 40-B12 (1984)
- WILKING, BRUCE A. Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. *Paul M. Harvey, Bruce A. Wilking, and Marshall Joy*. **278**, 156, 25-F8 (1984)
 Far-Infrared Studies of Herbig-Haro Objects and Their Exciting Stars. *Martin Cohen, Paul M. Harvey, Richard D. Schwartz, and Bruce A. Wilking*. **278**, 671, 33-C6 (1984)
 NGC 6334-V—An Infrared Bipolar Nebula. *Paul M. Harvey and Bruce A. Wilking*. **280**, L19, 54-D9 (1984)
 Far-Infrared Observations of Southern Herbig-Haro Objects. *Martin Cohen, Richard D. Schwartz, Paul M. Harvey, and Bruce A. Wilking*. **281**, 250, 63-E12 (1984)
 Infrared and Millimeter-Wave Observations of the Sharpless 156 Molecular Cloud. *Marshall Joy, Neal J. Evans II, Paul M. Harvey, and Bruce A. Wilking*. **284**, 161, 99-G5 (1984)
 The Nature of the Embedded Population in the Rho Ophiuchi Dark Cloud: Mid-Infrared Observations. *Charles J. Lada and Bruce A. Wilking*. **287**, 610, 140-G8 (1984)
 Far-Infrared Photometry of Compact Extragalactic Sources: OJ 287 and BL Lacertae. *Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking*. **287**, L9, 138-C10 (1984)
- WILKINSON, DAVID T. New Limits on Small-Scale Anisotropy in the Microwave Background. *Juan M. Uson and David T. Wilkinson*. **277**, L1, 16-A2 (1984)
 Small-Scale Isotropy of the Cosmic Microwave Background at 19.5 GHz. *Juan M. Uson and David T. Wilkinson*. **283**, 471, 92-A5 (1984)
- WILLIAMS, A. X-Ray Observations of X Persei. *M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Naranan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland*. **278**, 711, 33-F5 (1984)
- WILLIAMS, A. C. Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. *A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Darbro*. **276**, 691, 9-B1 (1984)
 Polarization of Comptonized Photons. *A. C. Williams*. **279**, 401, 41-C12 (1984)
- WILLIAMS, B. A. The Intergalactic H I Cloud in Leo: A Spitzer-Baade Collision Product? *Herbert J. Rood and B. A. Williams*. **285**, L5, 114-F6 (1984)
- WILLIAMS, R. D. Bound-State Decay of Rhenium-187. *R. D. Williams, W. A. Fowler, and S. E. Koonin*. **281**, 363, 64-G11 (1984)
- WILLIAMS, R. E. IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovak, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
- WILLIAMS, T. B. Imaging Spectrophotometric Observations of the Ionized Hydrogen Associated with M82. *T. B. Williams, Nelson Caldwell, and R. A. Schommer*. **281**, 579, 68-G7 (1984)
- WILLIS, A. G. High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis*. **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)
- WILLNER, S. P. Interstellar Absorption Lines in the Infrared Spectrum of NGC 2024 IRS 2. *John H. Black and S. P. Willner*. **279**, 673, 45-B14 (1984)
 1–20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward*. **280**, 514, 56-B5 (1984)
 The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. *Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner*. **280**, 521, 55-E6 (1984)
 Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga*. **284**, 523, 104-G5 (1984)
 Abundances in Galactic H II Regions. III. G25.4 – 0.2, G45.5 + 0.06, M8, S159, and DR 22. *J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones*. **285**, 174, 111-G5 (1984)
- WILLSON, ROBERT F. Very Large Array Observations of Solar Active Regions. IV. Structure and Evolution of Radio Bursts from 20 Centimeter Loops. *Robert F. Willson and Kenneth R. Lang*. **279**, 427, 41-E10 (1984)
 A Low Density Molecular Cloud in the Vicinity of the Pleiades. *S. R. Federman and Robert F. Willson*. **283**, 626, 93-F14 (1984)
- WILSON, A. S. Neutral Hydrogen in Seyfert Galaxies. I. *F. Mirabel and A. S. Wilson*. **277**, 92, 12-A3 (1984)
 Radio Structures of Seyfert Galaxies. V. A Flux-Limited Sample of Markarian Galaxies. *James S. Ulvestad and A. S. Wilson*. **278**, 544, 31-G9 (1984)
 Radio Structures of Seyfert Galaxies. VI. VLA Observations of a Nearby Sample. *James S. Ulvestad and A. S. Wilson*. **285**, 439, 116-C5 (1984)
- WILSON, JAMES R. A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. *John F. Hawley, Larry L. Smarr, and James R. Wilson*. **277**, 296, 14-B9 (1984)
 Planar Numerical Cosmology. II. The Difference Equations and Numerical Tests. *Joan Centrella and James R. Wilson*. **54**, 229, 4-F8 (1984) (Abstr. in **276**, 798, 10-B10)
 A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration. *John F. Hawley, Larry L. Smarr, and James R. Wilson*. **55**, 211, 13-G13 (1984) (Abstr. in **280**, 938, 60-B2)
- WILSON, T. L. The 8.7 GHz Hyperfine Line of $^3\text{He}^+$ in Galactic H II Regions. *Robert T. Rood, T. M. Bania, and T. L. Wilson*. **280**, 629, 56-F7 (1984)
 Ammonia Absorption toward NGC 7538 IRS 1: 2 Arc Second Observations in the (3,3) Line. *C. Henkel, T. L. Wilson, and K. J. Johnston*. **282**, L93, 85-D10 (1984)
 $^{21}\text{--}^{21}_2$ Formaldehyde Emission from DR 21(OH). *K. J. Johnston, C. Henkel, and T. L. Wilson*. **285**, L85, 121-G7 (1984)
- WINDHORST, ROGIER A. Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. *Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen*. **285**, 515, 117-B6 (1984)
- WINGET, D. E. PG 1654 + 160: A New Pulsating DB White Dwarf. *D. E. Winget, E. L. Robinson, R. E. Nather, and Suchitra Balachandran*. **279**, L15, 42-E2 (1984)
- WINKLER, P. FRANK. X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. *John J. Nugent, Steven H. Pravdo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler*. **284**, 612, 105-F13 (1984)
- WIRTH, ALLAN. The Families of Elliptical-like Galaxies. *Allan Wirth and John S. Gallagher III*. **282**, 85, 74-G10 (1984)
- WISE, MARK B. Large-Scale Anisotropy of the Microwave Background and the Amplitude of Energy Density Fluctuations in the Early Universe. *L. F. Abbott and Mark B. Wise*. **282**, L47, 85-A4 (1984)
 Relations between Spatial Correlations of Rich Clusters of Galaxies. *H. David Politzer and Mark B. Wise*. **285**, L1, 114-F3 (1984)
- WIŚNIEWSKI, W. Z. Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wiśniewski, F. A. Córdova, and K. O. Mason*. **284**, 512, 104-F8 (1984)
 Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. *S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wiśniewski, H. D. Aller, M. F. Aller, and P. E. Hodge*. **285**, 571, 117-G2 (1984)
- WITHBROE, GEORGE L. Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XII Lines. *George L. Withbroe and John C. Raymond*.

- 285, 347, 113-F7 (1984)
- WITT, A. N. The Variation of Galactic Interstellar Extinction in the Ultraviolet. A. N. Witt, R. C. Bohlin, and T. P. Stecher. **279**, 698, 45-D11 (1984)
- WITT, ADOLF N. Photometric Study of NGC 2023 in the 3500 Å to 10000 Å Region: Confirmation of a Near-IR Emission Process in Reflection Nebulae. Adolf N. Witt, Rudolph E. Schild, and James B. Krainman. **281**, 708, 70-C3 (1984)
- WITTEBORN, F. C. The Unusual 8–13 Micron Spectrum of Markarian 231. J. D. Bregman and F. C. Witteborn. **281**, L17, 65-F3 (1984)
- Absorption Features in the 5–8 Micron Spectra of Protostars. A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn. **287**, 697, 142-A1 (1984)
- WITZEL, A. The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus. **280**, 542, 55-F13 (1984)
- WOLFE, A. M. The Broad Absorption Lines in the Spectrum of the QSO PKS 1157 + 014: A Possible Link between Broad Absorption Line QSOs, Metal Enrichment, and the Formation of Galaxies. F. H. Briggs, D. A. Turnshek, and A. M. Wolfe. **287**, 549, 140-B8 (1984)
- WOLFF, H. The Self-consistent Response of Stellar Disks to Bar Forcing. K. O. Thielheim and H. Wolff. **276**, 135, 2-D2 (1984)
- WOLFF, MICHAEL T. A Numerical Study of the Stability of Radiative Shocks. James N. Imamura, Michael T. Wolff, and Richard H. Durisen. **276**, 667, 8-G2 (1984)
- WOLFF, S. C. Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. R. Brent Tully and S. C. Wolff. **281**, 67, 61-F3 (1984)
- Narrow-Band Imaging and Velocity Maps of Young Stellar Objects: Initial Results. J. S. Morgan, S. C. Wolff, S. E. Strom, and K. M. Strom. **285**, L71, 121-E14 (1984)
- WOLFF, SIDNEY C. 2 to 20 Micron Observations of Mass Loss from Early-Type Stars. David C. Abbott, C. M. Telesco, and Sidney C. Wolff. **279**, 225, 39-D14 (1984)
- WOLFIRE, MARK G. Properties of R136a as Derived from Its Optical Light Distribution. You-Hua Chu, Joseph P. Cassinelli, and Mark G. Wolfire. **283**, 560, 93-A4 (1984)
- WOLFSON, C. J. SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapple. **279**, 866, 47-C8 (1984)
- WOLSTENCROFT, R. D. The Infrared Dust Shell around the WC9 Star Ve 2-45. H. M. Dyck, Theodore Simon, and R. D. Wolstencroft. **277**, 675, 19-D14 (1984)
- Complete Quasar Search in the NGC 1097 Field. Halton Arp, R. D. Wolstencroft, and X. T. He. **285**, 44, 110-D7 (1984)
- WONG, PETER. On the Half-Life of ^{180}Ta in Stellar Environments. Eric B. Norman, Stephen E. Kellogg, Timothy Bertram, Salvador Gil, and Peter Wong. **281**, 360, 64-G8 (1984)
- WOOD, K. S. Millisecond Variability of Cygnus X-1. J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman. **278**, 288, 27-B6 (1984)
- Discovery of a 7.1 Hour Period and Eclipses from MXB 1659 – 29. L. R. Cominsky and K. S. Wood. **283**, 765, 95-C8 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yentis. **283**, L53, 97-C2 (1984)
- Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambruster, W. A. Snyder, and K. S. Wood. **284**, 770, 101-A5 (1984)
- Infrared Emission from Accretion Disks: Detectability and Variability. J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke. **284**, 745, 107-B9 (1984)
- An X-Ray Survey of Clusters of Galaxies. IV. A Survey of Southern Clusters and a Compilation of Upper Limits for Both Abell and Southern Galaxies. M. P. Kowalski, M. P. Ulmer, R. G. Cruddace, and K. S. Wood. **56**, 403, 29-A9 (1984) (Abstr. in **286**, 822, 132-A13)
- The HEAO A-1 X-Ray Source Catalog. K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidav. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- WOOD, P. R. Shock Waves in Mira Variables. I. Emission-Line Spectra. M. W. Fox, P. R. Wood, and M. A. Dopita. **286**, 337, 125-E8 (1984)
- WOODWARD, JAMES F. Pulsar Magnetogyro Ratios and Pulsar Evolution. III. Magnetic Field Generation. James F. Woodward. **279**, 803, 46-E7 (1984)
- WOODY, D. P. Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **282**, L59, 85-B4 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- WOOTEN, ALWYN. Formaldehyde in the Orion Molecular Flow: Evidence for a Gentle Acceleration. Alwyn Wooten, Robert B. Loren, and J. Bally. **277**, 189, 13-A9 (1984)
- The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO $^{+}$ Flow in NGC 2071. Alwyn Wooten, Robert B. Loren, Aage Sandqvist, Per Friberg, and Ake Hjalmarson. **279**, 633, 44-F14 (1984)
- SIS in Circumstellar Shells. R. Sahai, Alwyn Wooten, and R. E. S. Clegg. **284**, 144, 99-F2 (1984)
- The Detection of Interstellar Methyl-Diacetylene. Robert B. Loren, Alwyn Wooten, and Lee G. Mundy. **286**, L23, 126-E11 (1984)
- High-Velocity HCO $^{+}$ in Cepheus A: Ionization Levels in High-Density Clumps within a Molecular Flow. Robert B. Loren, Alwyn Wooten, Aa. Sandqvist, P. Friberg, and A. Hjalmarson. **287**, 707, 142-A11 (1984)
- WORDEN, SIMON P. The Response of Chromospheric Emission Lines to Flares on YZ Canis Minoris. Simon P. Worden, Timothy J. Schneebberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram. **276**, 270, 3-F14 (1984)
- Variations in the Solar Calcium K Line 1976–1982. Stephen L. Keil and Simon P. Worden. **276**, 766, 9-G6 (1984)
- WORLEY, CHARLES E. Duplicity of the "Supermassive" Object R136a. Charles E. Worley. **278**, L109, 36-B12 (1984)
- WORRALL, D. M. The Broad-Band X-Ray Spectrum of a QSO Sample. D. M. Worrall and F. E. Marshall. **276**, 434, 6-C10 (1984)
- Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. W. A. Baily, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and A. J. Primini. **279**, 555, 44-A1 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- Multifrequency Spectral Behavior of the BL Lacertae Objects OI 90.4 and 3C 66A. D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinosa, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller. **286**, 711, 131-G11 (1984)
- WOUTERLOOT, J. G. A. The Star-forming Region in Cepheus A. V. A. Hughes and J. G. A. Wouterloot. **276**, 204, 3-B2 (1984)
- WRATHALL, JAY. HRTS II EUV Observations of a Solar Ephemeral Region. Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner. **278**, 428, 28-E9 (1984)
- WRIGHT, ALAN E. Redshifts of Southern Radio Sources. VI. David L. Jauncey, Michael J. Batty, Alan E. Wright, Bruce A. Peterson, and Ann Savage. **286**, 498, 128-E8 (1984)
- WRIGHT, E. L. Dense Cores in Dark Clouds: Young Embedded Stars at 2 Micrometers. P. J. Benson, P. C. Myers, and E. L. Wright. **279**, L27, 42-E13 (1984)
- WRIGHT, M. C. H. Interaction of the Outflow and Quiescent Gas in Orion: HCO $^{+}$ Aperture Synthesis Maps. S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch. **283**, 655, 94-B2 (1984)
- WRIGHT, MELVYN. Hot Spots in Cygnus A at 89 GHz. Melvyn Wright and Mark Birkinshaw. **281**, 135, 62-D4 (1984)
- WRIGHT, MELVYN C. H. An Aperture Synthesis Map of HCN Emission Close to W3 IRS 4. Melvyn C. H. Wright, Hélène R. Dickel, and Paul T. P. Ho. **281**, L71, 73-B6 (1984)
- WROBEL, J. M. Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer. **276**, 480, 6-G3 (1984)
- Radio Continuum Activity in the Elliptical Galaxy NGC 1052. J. M. Wrobel. **284**, 531, 104-G13 (1984)
- Compact-Core-dominated Radio Emission from Bright E/S0 Galaxies. J. M. Wrobel and D. S. Heeschen. **287**, 41, 133-D5 (1984)
- WU, C. C. Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu. **276**, 92, 2-A1 (1984)
- WU, CHI-CHAO. IUE Observations of Centaurus X-4 during the 1979 May Outburst. William P. Blair, John C. Raymond, A. K. Dupree,

- Chi-Chao Wu, Albert V. Holm, and Jean H. Swank. **278**, 270, 27-A1 (1984)
- The Dust around R Coronae Borealis Type Stars. J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu. **280**, 228, 51-E3 (1984)
- WU, FEI. Linear Astrophysical Dynamos in Rotating Spheres: Differential Rotation, Anisotropic Turbulent Magnetic Diffusivity, and Solar-Stellar Cycle Magnetic Parity. Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu. **280**, 865, 59-C3 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Mode Transition between Steady and Oscillatory Dynamos as a Function of Dynamo Strength and Anisotropic Turbulent Magnetic Diffusivity. Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu. **283**, 870, 96-D5 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Solar and Stellar Cycle North-South Hemispheric Parity Selection Mechanism and Turbulent Magnetic Diffusivity. Hirokazu Yoshimura, Fei Wu, and Zhengzhi Wang. **285**, 325, 113-D9 (1984)
- WUNNER, G. Comment on "Scaling Laws for Hydrogen-like Atoms in Magnetic Fields of Arbitrary Strength". H. Herold, H. Ruder, and G. Wunner. **285**, 870, 121-A1 (1984)
- WYANT, J. Ionized Magnesium in the Planetary Nebula NGC 7027. S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant. **277**, 207, 13-B13 (1984)
- WYCKOFF, S. Host Galaxies of Quasars and Their Association with Galaxy Clusters. T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff. **278**, 11, 24-B2 (1984)
- WYNN-WILLIAMS, C. G. The Kleinmann-Low Nebula: An Infrared Cavity. C. G. Wynn-Williams, R. Genzel, E. E. Becklin, and D. Downes. **281**, 172, 62-F14 (1984)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper. **282**, 427, 79-G4 (1984)
- WYSE, ROSEMARY F. G. Rotation and Surface Brightness in Elliptical Galaxies. Rosemary F. G. Wyse and Bernard J. T. Jones. **286**, 88, 122-G8 (1984)
- YABUSHITA, S. On Galaxy Interactions during Violent Relaxation of Clusters. A. J. Allen and S. Yabushita. **278**, 468, 31-B2 (1984)
- YACKOVICH, F. H. Analyses of the Visual Spectra of White Dwarfs Containing Carbon. G. Wegner and F. H. Yackovich. **284**, 257, 100-G6 (1984)
- YAHIL, R. Z. On the Mechanism of Decelerating the Gas Infalling onto Magnetized Neutron Stars. A. Braun and R. Z. Yahil. **278**, 349, 27-F13 (1984)
- YAHIL, A. Nonlinear Evolution of Superclusters: Erratum. A. R. Rivolo and A. Yahil. **281**, 886, 72-B10 (1984) (Orig. paper in **274**, 474, 130-C8)
- Nonadiabatic Self-consistent Spherical Accretion as a Model for Quasars and Active Galactic Nuclei. A. Wandel, A. Yahil, and M. Milgrom. **282**, 53, 74-E4 (1984)
- Explosive Nucleosynthesis in Massive Stars: Comparison with the Cassiopeia A Fast-moving Knots. M. D. Johnston and A. Yahil. **285**, 587, 118-A4 (1984)
- YAMASHITA, K. A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **276**, L41, 10-E12 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- YANAGITA, SHOHEI. Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest. **283**, 439, 90-G5 (1984)
- YANG, J. Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive. **281**, 493, 68-A5 (1984)
- YANG, L. T. On the Overstability of Axisymmetric Oscillations in Thin Accretion Disks. G. R. Blumenthal, L. T. Yang, and D. N. C. Lin. **287**, 774, 142-F11 (1984)
- YEE, H. K. C. An Imaging Survey of Fields around Quasars. II. The Association of Galaxies with Quasars. H. K. C. Yee and Richard F. Green. **280**, 79, 49-G10 (1984)
- An Imaging Survey of Fields around Quasars. I. A Catalog. Richard F. Green and H. K. C. Yee. **54**, 495, 8-E5 (1984) (Abstr. in **278**, 895, 35-E13)
- YENTIS, D. J. Millisecond Variability of Cygnus X-1. J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman. **278**, 288, 27-B6 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yentis. **283**, L53, 97-C2 (1984)
- The HEAO A-1 X-Ray Source Catalog. K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidav. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- YOKOI, K. The s-Process Branching at ^{151}Sm . H. Beer, F. Käppeler, K. Yokoi, and K. Takahashi. **278**, 588, 28-B11 (1984)
- YOKOI, KOICHI. Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi. **286**, 644, 130-B14 (1984)
- YORK, D. G. Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu. **276**, 92, 2-A1 (1984)
- Abundance of Interstellar Aluminum. E. S. Barker, P. M. Lugger, E. J. Weiler, and D. G. York. **280**, 600, 56-D5 (1984)
- Splitting of C IV Lines in a QSO Absorption-Line System. D. G. York, Richard F. Green, Jill Bechtold, and Frederic H. Chaffee, Jr. **280**, L1, 54-C2 (1984)
- Interstellar Magnesium Abundances. M. J. Murray, P. L. Dufton, A. Hibbert, and D. G. York. **282**, 481, 80-D5 (1984)
- YORK, DONALD G. Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York. **281**, 585, 69-A5 (1984)
- YOSHIMURA, HIROKAZU. Linear Astrophysical Dynamos in Rotating Spheres: Differential Rotation, Anisotropic Turbulent Magnetic Diffusivity, and Solar-Stellar Cycle Magnetic Parity. Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu. **280**, 865, 59-C3 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Mode Transition between Steady and Oscillatory Dynamos as a Function of Dynamo Strength and Anisotropic Turbulent Magnetic Diffusivity. Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu. **283**, 870, 96-D5 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Solar and Stellar Cycle North-South Hemispheric Parity Selection Mechanism and Turbulent Magnetic Diffusivity. Hirokazu Yoshimura, Fei Wu, and Zhengzhi Wang. **285**, 325, 113-D9 (1984)
- YOSHINO, K. Interstellar O₂. II. VUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman. **277**, 569, 18-C5 (1984)
- YOUNG, ARTHUR. Rapid Rotation and H α Emission Anomalies among Some Members of the Population of Low-Mass Stars. Arthur Young, Andrew Skumanich, and Eugene Harlan. **282**, 683, 82-D13 (1984)
- YOUNG, E. The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- Infrared Emission from M31. H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer. **278**, L59, 30-A1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann,

- C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: *IRAS* Observations of the Hercules Cluster (Abell 2151). E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier. **278**, L75, 30-C9 (1984)
- A 25 Micron Component in 3C 390.3. G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young. **278**, L79, 30-C14 (1984)
- IRAS* Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- YOUNG, JUDITH S. CO Emission from the Star-Burst Irregular Galaxy NGC 1569. Judith S. Young, J. S. Gallagher, and Deidre A. Hunter. **276**, 476, 6-F13 (1984)
- Molecular Clouds in M82. Judith S. Young and N. Z. Scoville. **287**, 153, 134-E12 (1984)
- CO Emission from *IRAS* Galaxies. Judith S. Young, Jeffrey Kenney, Steven D. Lord, and F. Peter Schloerb. **287**, L65, 145-C14 (1984)
- YUAN, C. On the "3 Kiloparsec Arm": Resonance Excitation of Linear and Nonlinear Waves by an Oval Distortion in the Central Region. C. Yuan. **281**, 600, 69-B6 (1984)
- YUNG, YUK L. Photochemistry of the Atmosphere of Titan: Comparison between Model and Observations. Yuk L. Yung, Mark Allen, and Joseph P. Pinto. **55**, 465, 17-C3 (1984) (Abstr. in **281**, 892, 72-C5)
- YUSEF-ZADEH, F. Bipolar Reflection Nebulae: Monte Carlo Simulations. F. Yusef-Zadeh, Mark Morris, and Richard L. White. **278**, 186, 26-A11 (1984)
- ZAMIR, M. Some Effects of Rotation on the Structure and Dynamics of a Radiation-driven Wind from a Hot Star. J. M. Marlborough and M. Zamir. **276**, 706, 9-C2 (1984)
- ZAMORANI, G. X-Ray Variability of Quasars. G. Zamorani, P. Giommi, T. Maccacaro, and H. Tananbaum. **278**, 28, 24-C11 (1984)
- A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- ZANDER, R. The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. A. J. Sauval, N. Grevesse, J. W. Brault, G. M. Stokes, and R. Zander. **282**, 330, 77-D9 (1984)
- ZARRO, D. M. Consequences of a Chromospheric Temperature Gradient on the Width of H α in Late-Type Giants. D. M. Zarro. **285**, 232, 112-D11 (1984)
- ZDZIARSKI, ANDRZEJ A. Spectra from Pair-Equilibrium Plasmas. Andrzej A. Zdziarski. **283**, 842, 96-B5 (1984)
- ZENCHENKO, V. M. Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt. **280**, 150, 50-E14 (1984)
- On the Morphology and Spectra of the Short Gamma-Ray Bursts. C. Barat, R. I. Hayles, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zenchenko. **285**, 791, 120-B3 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Il'vaysky, and C. Motch. **286**, L5, 126-D7 (1984)
- Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolidze. **286**, L11, 126-D14 (1984)
- Three Precise Gamma-Ray Burst Source Locations. T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer. **286**, L15, 126-F3 (1984)
- ZENSUS, A. The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus. **280**, 542, 55-F13 (1984)
- ZETTERBERG, PER OLOF. Laboratory Identification of the $3s^2 3p^2 \ ^3P_{2,1} - 3s 3p^3 \ ^5S_2$ Intersystem Lines of S III. Peter L. Smith, Carl Erik Magnusson, and Per Olof Zetterberg. **277**, L79, 23-A5 (1984)
- ZHANG, E.-H. Time-resolved Spectroscopy of SS Cygni at Minimum and Maximum Light. F. V. Hessman, E. L. Robinson, R. E. Nather, and E.-H. Zhang. **286**, 747, 131-C8 (1984)
- ZIMMERMAN, ROBERT L. Primordial Gravitational Waves and the Blackbody Radiation Anisotropy. Peter J. Adams, Ronald W. Hellings, and Robert L. Zimmerman. **280**, L39, 60-D4 (1984)
- ZIMMERMANN, H. U. Evidence for 4.4 Hour Periodic Dips in the X-Ray Flux from 4U 1755-33. N. E. White, A. N. Parmar, M. Sztajno, H. U. Zimmermann, K. O. Mason, and S. M. Kahn. **283**, L9, 91-E11 (1984)
- ZIMMERMANN, P. 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann. **283**, 106, 87-B13 (1984)
- A Search for 183 GHz Emission from Water in Late-Type Stars. T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodriguez Kuiper, and P. Zimmermann. **286**, 310, 125-C9 (1984)
- ZINN, ROBERT. The Globular Cluster System of the Galaxy. III. Measurements of Radial Velocity and Metallicity for 60 Clusters and a Compilation of Metallicities for 121 Clusters. Robert Zinn and Michael J. West. **55**, 45, 11-D4 (1984) (Abstr. in **279**, 910, 47-G1)
- ZIPSE, J. E. A Measurement of the Absolute Flux of Cosmic-Ray Electrons. R. L. Golden, B. G. Mauger, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse. **287**, 622, 141-A6 (1984)
- ZIRIN, HAROLD. Evidence for Magnetic Field Rearrangement in a Solar Flare. Harold Zirin. **281**, 884, 72-B6 (1984)
- ZITELLI, V. A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- ZIURY, L. M. A Search for Interstellar Silicon Nitride. L. M. Ziury, D. P. Clemens, R. J. Saykally, M. Colvin, and H. F. Schaefer. **281**, 219, 63-C9 (1984)
- CN in Dark Interstellar Clouds. Richard M. Crutcher, Ed Churchwell, and L. M. Ziury. **283**, 668, 94-C4 (1984)
- ZOLLER, P. Radiative Transfer Equations in Broad-Band, Time-varying Fields. J. Cooper and P. Zoller. **277**, 813, 21-A8 (1984)
- ZUCKERMAN, B. Methyl Acetylene as a Temperature Probe for Dense Interstellar Clouds. T. B. H. Kuiper, E. N. Rodriguez Kuiper, Dale F. Dickinson, B. E. Turner, and B. Zuckerman. **276**, 211, 3-B9 (1984)
- The Tauri Radio Source. P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell. **280**, L23, 54-D13 (1984)
- Discovery of Solar System-Size Halos around Young Stars. S. Beckwith, B. Zuckerman, M. F. Skrutskie, and H. M. Dyck. **287**, 793, 143-A2 (1984)
- Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith. **287**, 801, 143-A10 (1984)
- ZWEIBEL, E. G. Electromagnetic Damping of Neutron Star Oscillations. P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen. **281**, 746, 70-F2 (1984)
- ZYLSTRA, G. New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yentis. **283**, L53, 97-C2 (1984)



SUBJECT HEADING TABLE OF CONTENTS

- 87

- Nebulae: General 122 2-C7
 Nebulae: H II Regions 122 2-C7
 Nebulae: Individual 123 2-C8
 By Messier Number 123 2-C8
 By NGC Number 123 2-C8
 By Other Designation: Names 123 2-C8
 By Other Designation: Alphanumeric 124 2-C9
 Nebulae: Orion Nebula 124 2-C9
 Nebulae: Planetary 125 2-C10
 Nebulae: Reflection 125 2-C10
 Nebulae: Supernova Remnants 125 2-C10
 Neutrinos 126 2-C11
 Notices 126 2-C11
 Nuclear Reaction 126 2-C11
 Nucleosynthesis 126 2-C11
 Numerical Methods 127 2-C12

 Occultations 127 2-C12
 Opacities 127 2-C12

 Particle Acceleration 127 2-C12
 Photometry 128 2-C13
 Planets: Abundances 128 2-C13
 Planets: Atmospheres 128 2-C13
 Planets: General 128 2-C13
 Planets: Interiors 128 2-C13
 Planets: Jupiter 128 2-C13
 Planets: Magnetospheres 128 2-C13
 Planets: Mercury 128 2-C13
 Planets: Radio Radiation 128 2-C13
 Planets: Satellites 129 2-C14
 Planets: Saturn 129 2-C14
 Planets: Spectra 129 2-C14
 Planets: Uranus 129 2-C14
 Plasmas 129 2-C14
 Polarization 129 2-C14
 Proper Motions: *see* Stars: Proper-Motion 154 2-E11;
 Stars: Stellar Dynamics 156 2-E13
 Pulsars 130 2-D1

 Quantum Mechanics 131 2-D2
 Quasars 131 2-D2

 Radar Astronomy 132 2-D3
 Radial Velocities 132 2-D3
 Radiation Mechanisms 132 2-D3
 Radiative Transfer 133 2-D4
 Radio Sources: Extended 134 2-D5
 Radio Sources: Galaxies 134 2-D5
 Radio Sources: General 135 2-D6
 Radio Sources: Identifications 135 2-D6
 Radio Sources: Lines 135 2-D6
 Radio Sources: Spectra 135 2-D6
 Radio Sources: 21 cm Radiation 135 2-D6
 Radio Sources: Variable 136 2-D7
 Relativity 136 2-D7
 Rotation 136 2-D7

 Shock Waves 136 2-D7
 Sky Photographs 137 2-D8
 Solar System: General 137 2-D8
 Spectrophotometry 137 2-D8
 Spiral Structure: *see* Galaxies: Structure 106 2-B5
 SS Cygni Stars: *see* Stars: U Geminorum 157 2-E14
 Stars: Abundances 138 2-D9
 Stars: Accretion 139 2-D10
 Stars: Atmospheres 139 2-D10
 Stars: Ba II 140 2-D11
 Stars: Be 140 2-D11
 Stars: β Cephei 140 2-D11
 Stars: Binaries 140 2-D11
 Stars: Carbon 141 2-D12
 Stars: Catalogs 141 2-D12
 Stars: Cepheids 141 2-D12
 Stars: Chromospheres 142 2-D13
 Stars: Circumstellar Shells 142 2-D13
 Stars: Collapsed 143 2-D14
 Stars: Combination Spectra 143 2-D14
 Stars: Coronae 143 2-D14
 Stars: δ Scuti 143 2-D14
 Stars: Diameters 143 2-D14
 Stars: Dwarf Novae 143 2-D14
 Stars: Early-Type 144 2-E1
 Stars: Eclipsing Binaries 144 2-E1
 Stars: Emission-Line 144 2-E1
 Stars: Evolution 145 2-E2
 Stars: Faint Blue 145 2-E2
 Stars: Flare 146 2-E3
 Stars: Formation 146 2-E3
 Stars: High-Velocity 147 2-E4
 Stars: Horizontal Branch 147 2-E4
 Stars: Hydrogen Deficient 147 2-E4
 Stars: Individual 147 2-E4
 By Constellation Name 147 2-E4
 By Bright Star Number 148 2-E5
 By Henry Draper Number 149 2-E6
 By Other Designation 149 2-E6
 Stars: Interiors 149 2-E6
 Stars: Late-Type 150 2-E7
 Stars: Long-Period Variables 151 2-E8
 Stars: Luminosities 151 2-E8
 Stars: Magnetic 151 2-E8
 Stars: Massive 152 2-E9
 Stars: Mass Loss 152 2-E9
 Stars: Metallic-Line 153 2-E10
 Stars: Neutron 153 2-E10
 Stars: Novae 153 2-E10
 Stars: Of-Type 153 2-E10
 Stars: Peculiar A 154 2-E11
 Stars: Population II 154 2-E11
 Stars: Pre-Main-Sequence 154 2-E11
 Stars: Proper-Motion 154 2-E11
 Stars: Pulsation 154 2-E11
 Stars: Radio Radiation 155 2-E12
 Stars: R Coronae Borealis 155 2-E12
 Stars: Rotation 155 2-E12
 Stars: RR Lyrae 156 2-E13
 Stars: RV Tauri 156 2-E13
 Stars: Semiregular Variables 156 2-E13
 Stars: Spectral Classification 156 2-E13
 Stars: Spectrum Variables 156 2-E13
 Stars: Stellar Dynamics 156 2-E13
 Stars: Stellar Statistics 157 2-E14
 Stars: Subdwarfs 157 2-E14
 Stars: Supergiants 157 2-E14
 Stars: Supernovae 157 2-E14
 Stars: U Geminorum 157 2-E14
 Stars: Variables 158 2-F1
 Stars: Visual Multiples 158 2-F1
 Stars: Weak-Line 158 2-F1
 Stars: White Dwarfs 158 2-F1
 Stars: Winds 159 2-F2

- Stars: Wolf-Rayet 159 2-F2
Stars: W Ursae Majoris 160 2-F3
Sun: Abundances 160 2-F3
Sun: Activity 160 2-F3
Sun: Atmosphere 160 2-F3
Sun: Atmospheric Motions 160 2-F3
Sun: Chromosphere 160 2-F3
Sun: Corona 161 2-F4
Sun: Eclipses 161 2-F4
Sun: Faculae 161 2-F4
Sun: Flares 161 2-F4
Sun: General 162 2-F5
Sun: Granulation 162 2-F5
Sun: Interior 162 2-F5
Sun: Limb Darkening 163 2-F6
Sun: Magnetic Fields 163 2-F6
Sun: Oscillations 163 2-F6
Sun: Plages 163 2-F6
Sun: Prominences 163 2-F6
Sun: Radio Radiation 163 2-F6
Sun: Rotation 163 2-F6
Sun: Solar Wind 164 2-F7
Sun: Spectra 164 2-F7
Sun: Spectroheliograms 164 2-F7
Sun: Sunspots 164 2-F7
Sun: X-Rays 164 2-F7
Symbiotic Stars: *see* Stars: Combination Spectra 143 2-D14
3° Cosmic Radiation: *see* Cosmic Background Radiation 94 2-A7
Transition Probabilities 165 2-F8
T Tauri Stars: *see* Stars: Pre-Main-Sequence 154 2-E11
Turbulence 165 2-F8
Ultraviolet: General 165 2-F8
Ultraviolet: Spectra 165 2-F8
W Virginis Stars: *see* Stars: Cepheids 141 2-D12
X-Rays: Binaries 167 2-F10
X-Rays: Bursts 168 2-F11
X-Rays: General 168 2-F11
X-Rays: Sources 169 2-F12
X-Rays: Spectra 170 2-F13
Zeeman Effect 171 2-F14



SUBJECT INDEX

Absolute Magnitudes: see Stars: Luminosities

Absorption: see Opacities

Abundances

- The *s*-Process Branching at ^{151}Sm . *H. Beer, F. Käppeler, K. Yokoi, and K. Takahashi.* **278**, 388, 28-B11 (1984)
- Temperature and Elemental Abundances in the Abell Cluster A576 Derived from X-Ray Observations. *R. Rothenflug, L. Vigroux, R. F. Mushotzky, and S. S. Holt.* **279**, 53, 37-E6 (1984)
- p*-Process Nucleosynthesis and the Abundances of the Minor Isotopes of Tin. *J. R. De Laeter, K. J. R. Rosman, and R. D. Loss.* **279**, 814, 46-F4 (1984)
- Bound-State Decay of Rhenium-187. *R. D. Williams, W. A. Fowler, and S. E. Koonin.* **281**, 363, 64-G11 (1984)
- On the Bizarre Gamma-Ray Spectrum of SS 433. *H. L. Helfer and M. P. Savedoff.* **283**, L49, 97-B12 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin.* **284**, 118, 99-D1 (1984)
- Spectrophotometry of Intermediate-Redshift Quasars. *Alan Uomoto.* **284**, 497, 104-E7 (1984)
- Neutron Capture Nucleosynthesis of Neodymium Isotopes and the *s*-Process from $A = 130$ to 150 . *G. J. Mathews and F. Käppeler.* **286**, 810, 132-A1 (1984)

Addenda: see Errata and Addenda

Announcements: see Notices

Atomic Processes

- Electrical and Thermal Conductivities of Dense Matter in the Liquid Metal Phase. II. Low-Temperature Quantum Corrections. *Shinichi Mitake, Setsuo Ichimaru, and Naoki Itoh.* **277**, 375, 15-A4 (1984)
- Calculations of Transition Probabilities for Forbidden Lines in the $3d^7$ Ground Configurations of Co III and Ni IV. *J. E. Hansen, A. J. J. Raassen, and P. H. M. Uylings.* **277**, 435, 15-E13 (1984)
- Coronal [Fe] Lines in Supernova Remnants: Nonequilibrium Ionization Models. *Richard G. Teske.* **277**, 832, 21-B13 (1984)
- The Line Continuum Luminosity Ratio in Active Galactic Nuclei: Or, On the "Baldwin Effect". *R. Mushotzky and G. J. Ferland.* **278**, 558, 32-A9 (1984)
- Induced Atomic Orientation, An Efficient Mechanism for Magnetic Circular Polarization. *James C. Kemp, Joseph H. Macek, and Frederick W. Nehring.* **278**, 863, 35-C9 (1984)
- Electron Excitation Rate Coefficients for Transitions from the $1s^2\ ^1S$ Ground State to the $1s2s\ ^1S$ and $1s2p\ ^1P^o$ Excited States of Helium. *K. M. Aggarwal, A. E. Kingston, and M. R. C. McDowell.* **278**, 874, 35-D6 (1984)
- The Direct Measurement of the $3\ ^3P_0 - 3\ ^3P_1$ Fine-Structure Interval and the g_J -Factor of Atomic Silicon by Laser Magnetic Resonance. *Massimo Inguscio, K. M. Evenson, Virgilio Beltrán-Lopez, and Eugenio Lev-Koo.* **278**, L127, 36-D9 (1984)
- The Effects of a Multidensity Plasma on Ultraviolet Spectroscopic Electron Density Diagnostics. *G. A. Doschek.* **279**, 446, 41-G7 (1984)
- Collisional Excitation Rate Coefficients for Fe XI. *Jieh-Shan Wang, Arny Marotta, and Raju U. Datla.* **279**, 460, 42-A8 (1984)
- Electron Density-Dependent Intensity Ratios of Highly Ionized Iron Lines: A Comparison of Theory and Experiment. *B. C. Stratton, H. W. Moos, and M. Finkenthal.* **279**, L31, 42-F3 (1984)
- The 8.7 GHz Hyperfine Line of $^3\text{He}^+$ in Galactic H II Regions. *Robert T. Rood, T. M. Bania, and T. L. Wilson.* **280**, 629, 56-F7 (1984)
- Observational Evidence for Non-Maxwellian Electron Energy Distributions in the Solar Transition Region. *P. L. Dufton, A. E. Kingston, and F. P. Keenan.* **280**, L35, 54-E11 (1984)
- The Unusual Nickel/Iron Abundance Ratio in the Crab Nebula Filaments. *Richard B. C. Henry.* **281**, 644, 69-E8 (1984)
- The Identification of Hydrogen in Grw +70°8247. *Jesse L. Greenstein.* **281**, L47, 67-A1 (1984)
- Oscillator Strengths and Collision Strengths for S III. *Y. K. Ho and Ronald J. W. Henry.* **282**, 816, 84-A6 (1984)

Photoionization Models and Diagnosis of Physical Properties of the Broad-Line Emission Gas in Quasars and Seyfert Nuclei. *John Kwan.* **283**, 70, 86-G5 (1984)

Is the Metal Contribution to the Astrophysical Opacity Incorrect? *N. H. Magee, Jr., A. L. Merts, and W. F. Huebner.* **283**, 264, 88-G10 (1984)

Discrepancy in the CNO Opacity Bump Resolved. *T. R. Carson, W. F. Huebner, N. H. Magee, Jr., and A. L. Merts.* **283**, 466, 91-B7 (1984)

Collision Strengths for $\lambda 1199$ and $\lambda 1729$ of S III. *Y. K. Ho and Ronald J. W. Henry.* **284**, 435, 102-F2 (1984)

Isotope Shifts of Some Ultraviolet Transitions of First Row Elements. *Charles W. Clark.* **285**, 322, 113-D6 (1984)

Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XII Lines. *George L. Withbroe and John C. Raymond.* **285**, 347, 113-F7 (1984)

Comment on "Scaling Laws for Hydrogen-like Atoms in Magnetic Fields of Arbitrary Strength". *H. Herold, H. Ruder, and G. Wunner.* **285**, 870, 121-A1 (1984)

Soft X-Ray Opacity in Hot and Photoionized Gases. *Julian H. Krolik and Timothy R. Kallman.* **286**, 366, 125-G9 (1984)

Quantal Calculations of Charge Transfer in Collisions between N V and Atomic Hydrogen. *C. A. Feickert, R. J. Blint, G. T. Surratt, and W. D. Watson.* **286**, 371, 126-A1 (1984)

On Bowen Enhancement of the N III Spectrum under Solar and Nebulae Conditions. *S. O. Kastner and A. K. Bhatia.* **287**, 945, 144-E4 (1984)

Electron Impact Excitation Rates for Fine-Structure Transitions in Ne V and Si IX: An R-Matrix Approach. *K. M. Aggarwal.* **54**, 1, 1-A2 (1984) (Abstr. in **275**, 926, 147-E13)

Inner Shell Excitation of Lithium-like Ions. *Stephen J. Goett, Douglas H. Sampson, and Robert E. H. Clark.* **54**, 115, 2-E2 (1984) (Abstr. in **275**, 928, 147-F1)

High Energy Collision Strengths and Limits of Excitation of Hydrogenic Ions by Electron Impact. *D. H. Oza.* **54**, 395, 7-B8 (1984) (Abstr. in **277**, 907, 22-A8)

Electron Impact Excitation of Forbidden Transitions in Mg II. *K. M. Aggarwal.* **56**, 303, 27-A13 (1984) (Abstr. in **285**, 874, 121-A5)

Propagation of Heavy Cosmic-Ray Nuclei. *John R. Letaw, Rein Silberberg, and C. H. Tsao.* **56**, 369, 27-F9 (1984) (Abstr. in **285**, 875, 121-A6)

Autoionization: see Atomic Processes

Black Holes

The Central X-Ray Source in SS 433. *J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall.* **277**, 286, 14-A13 (1984)

A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. *John F. Hawley, Larry L. Smarr, and James R. Wilson.* **277**, 296, 14-B9 (1984)

Millisecond Variability of Cygnus X-1. *J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman.* **278**, 288, 27-B6 (1984)

Two-Temperature Model of Spherical Accretion onto a Black Hole. *M. Colpi, L. Maraschi, and A. Treves.* **280**, 319, 52-D11 (1984)

Gamma-Rays from Rotating Black Holes. *N. Panchapakesan and Vijay Prakash.* **280**, 848, 59-A14 (1984)

Nonadiabatic Self-consistent Spherical Accretion as a Model for Quasars and Active Galactic Nuclei. *A. Wandel, A. Yahil, and M. Milgrom.* **282**, 53, 74-E4 (1984)

Black Hole Accretion Disks: Coronal Stabilization of the Lightman-Eardley Instability. *James A. Ionson and Max Kuperus.* **284**, 389, 102-B12 (1984)

Optically Thick, Time-dependent Spherical Accretion onto a Black Hole. I. Equations and Numerical Methods. *Peter Vitello.* **284**, 394, 102-C3 (1984)

On the Origin of X-Ray Variability of SS 433. *David L. Band and Jonathan E. Grindlay.* **285**, 702, 119-B11 (1984)

Black Holes—Continued

Short-Term X-Ray Variability of GX 339-4. Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi. **285**, 712, 119-C7 (1984)

A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration. John F. Hawley, Larry L. Smarr, and James R. Wilson. **55**, 211, 13-G13 (1984) (Abstr. in **280**, 938, 60-B2)

BL Lacertae Objects

A Search for Faint Highly Polarized Objects. Ermanno F. Borra and Gilles Corvieu. **276**, 449, 6-D11 (1984)

Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)

Variability of the Ultraviolet Spectrum of BL Lacertae Objects. M. H. Ulrich, K. R. H. Hackney, R. L. Hackney, and Y. Kondo. **276**, 466, 6-F2 (1984)

Rapid Radio Variations in the Flux Density of BL Lacertae. K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Jostes, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis. **277**, L30, 22-D11 (1984)

Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)

A Sharp X-Ray Absorption Feature in the BL Lacertae Object PKS 2155 - 304. Claude R. Canizares and John Kruper. **278**, L99, 36-B2 (1984)

Optical Observations of the BL Lacertae Object 2155 - 304 and Implications regarding the X-Ray Absorption Feature at 600-700 eV. Stuart Bowyer, Jean Brodie, John T. Clarke, and J. Patrick Henry. **278**, L103, 36-B7 (1984)

The Radio Morphology of Blazars and Relationships to Optical Polarization and to Normal Radio Galaxies. J. F. C. Wardle, Richard L. Moore, and J. R. P. Angel. **279**, 93, 38-A9 (1984)

On the Rapid Optical Variability of PKS 0129 - 164. K. Meisenheimer and H. J. Röser. **279**, L39, 48-A7 (1984)

The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus. **280**, 542, 55-F13 (1984)

Luminosity Enhancement in Relativistic Jets and Altered Luminosity Functions for Beamed Objects. C. M. Urry and R. A. Shafer. **280**, 569, 55-A14 (1984)

Wavelength-Dependent Polarization in the Optical Flux of the BL Lacertae Object B2 1308 + 326. Michael L. Sitko, Wayne A. Stein, and Gary D. Schmidt. **282**, 29, 74-C6 (1984)

Hard X-Ray Variability of Three Active Galactic Nuclei. P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda. **284**, 54, 98-E3 (1984)

The Sub-Milliarsecond Radio Structure of AO 0235 + 164. Dayton L. Jones, Lars B. Bååth, Michael M. Davis, and Stephen C. Unwin. **284**, 60, 98-E9 (1984)

Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)

On the Surface Density of X-Ray Selected BL Lacertae Objects. Tommaso Maccacaro, Isabella M. Gioia, Dario Maccagni, and John T. Stocke. **284**, L23, 109-A6 (1984)

Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge. **285**, 571, 117-G2 (1984)

Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. G. J. Ferland and R. F. Mushotzky. **286**, 42, 122-D4 (1984)

Multifrequency Spectral Behavior of the BL Lacertae Objects OJ 90.4 and 3C 66A. D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinosa, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller. **286**, 711, 131-G11 (1984)

The Extragalactic Nature of H0323 + 022. Bruce Margon and George H. Jacoby. **286**, L31, 132-D2 (1984)

Far-Infrared Photometry of Compact Extragalactic Sources: OJ 287 and BL Lacertae. Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking. **287**, L9, 138-C10 (1984)

Ca II Emission

An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan. **276**, 254, 3-E12 (1984)

Observations of Magnetic Fields on Solar-Type Stars. Geoffrey W. Marcy. **276**, 286, 4-A2 (1984)

Variations in the Solar Calcium K Line 1976-1982. Stephen L. Keil and Simon P. Worden. **276**, 766, 9-G6 (1984)

Rotational Modulation of the Chromospheric Activity in χ^1 Orionis (G0 V). Ann Merchant Boesgaard and Theodore Simon. **277**, 241, 13-E5 (1984)

Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan. **279**, 763, 46-B8 (1984)

The Sun as a Star: 1982 June 14-August 13. R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime. **280**, 873, 59-C11 (1984)

The Sun as a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston. **282**, 776, 83-E3 (1984)

Age-Rotation Relationship for Late-Type Main-Sequence Stars. T. N. Rengarajan. **283**, L63, 97-C14 (1984)

Asymmetries in Stellar Mg II h and k and Ca II H and K Line Profiles: Discrepancies Between Mg and Ca Asymmetries. D. J. Mullan. **284**, 769, 107-D5 (1984)

Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)

The Space Orientation of Stars. Laurance R. Doyle, Thomas J. Wilcox, and Jean J. Lorre. **287**, 307, 136-C10 (1984)

The Relation between Stellar Rotation Rate and Activity Cycle Periods. Robert W. Noyes, Nigel O. Weiss, and Arthur H. Vaughan. **287**, 769, 142-F6 (1984)

Ca II Emission Surface Fluxes in Active Chromosphere Stars. Bernard W. Bopp. **54**, 387, 7-A14 (1984) (Abstr. in **277**, 907, 22-A8)

Cataclysmic Stars: see Stars: Novae; Stars: U Geminorum

Celestial Mechanics

Conservative Mass Transfer. II. The Effective Perturbing Force: Equations of Motion for the Eccentricity and Orbital Period. John J. Mateo and Daniel P. Whitmire. **282**, 522, 80-G4 (1984)

Excitation of Inclinations in Ring-Satellite Systems. Nicole Borderies, Peter Goldreich, and Scott Tremaine. **284**, 429, 102-E10 (1984)

Clusters: Associations

Ultraviolet Observations of Interstellar Extinction near the Cepheus OB3 Molecular Cloud. Derck Massa and Blair D. Savage. **279**, 310, 40-D5 (1984)

An Investigation of the Stellar Association Containing the 1.95 Day Cepheid SU Cassiopeiae. David G. Turner and Nancy Remage Evans. **283**, 254, 88-F13 (1984)

The Galaxy as a Self-regulated Star-forming System: The Case of the OB Associations. José Franco and Steven N. Shore. **285**, 813, 120-C13 (1984)

Clusters: Globular

AM-1: A Very Distant Globular Cluster. Marc Aaronson, Robert A. Schommer, and Edward W. Olszewski. **276**, 221, 3-C5 (1984)

The NGC 5128 Globular Cluster System. James E. Hesser, Hugh C. Harris, Sidney van den Bergh, and Gretchen L. H. Harris. **276**, 491, 7-A1 (1984)

LMC Blue Globular Clusters Containing Cepheids. I. NGC 1856. P. W. Hodge and S.-O. Lee. **276**, 509, 7-B7 (1984)

Stability of Gravitational Systems and Gravothermal Catastrophe in Astrophysics. J. F. Sygnet, G. Des Forêts, M. Lachièze-Rey, and R. Pellat. **276**, 737, 9-E5 (1984)

A Photometric Comparison of Late-Type Cluster Supergiants in the Magellanic Clouds and the Galaxy. P. J. McGregor and A. R. Hyland. **277**, 149, 12-E7 (1984)

On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. Roberto Buonanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaico, and William Liller. **277**, 220, 13-C12 (1984)

Deep CCD Photometry in Globular Clusters. I. The Main Sequence of M4. Harvey B. Richer and G. G. Fahlgren. **277**, 227, 13-D5 (1984)

Dark Matter and the Origin of Galaxies and Globular Star Clusters. P. J. E. Peebles. **277**, 470, 17-C2 (1984)

The Anticorrelation of Cyanogen and CH on the Giant Branch of 47 Tucanae. John Norris, K. C. Freeman, and G. S. Da Costa. **277**, 615, 18-F10 (1984)

Is There Life after Core Collapse in Globular Clusters? Haldan Cohn and Piet Hut. **277**, L45, 22-E10 (1984)

Surface Photometry in Cores of Globular Clusters. S. Djorgovski and Ivan R. King. **277**, L49, 22-E14 (1984)

The Stellar Content and Metallicity of the NGC 5128 Globular Cluster. Jay A. Frogel. **278**, 119, 25-C11 (1984)

- On the Metallicity of Blue Horizontal-Branch Stars in M4 and NGC 6397. *K. Kodaira and A. G. Davis Philip*. **278**, 201, 26-B12 (1984)
- Core Collapse with Strong Encounters: Erratum. *Jeremy Goodman*. **278**, 893, 35-E11 (1984) (Orig. paper in **270**, 700, 85-F10)
- Homologous Evolution of Stellar Systems after Core Collapse. *Jeremy Goodman*. **280**, 298, 52-C4 (1984)
- The Intermediate Age SMC Globular Cluster Lindsay 113. *J. R. Mould, G. S. Da Costa, and M. D. Crawford*. **280**, 595, 56-C12 (1984)
- The Binary Nature of the CH Stars. *Robert D. McClure*. **280**, L31, 54-E7 (1984)
- The Clusters of M33. *J. G. Cohen, S. E. Persson, and L. Searle*. **281**, 141, 62-D10 (1984)
- Metal Abundances of Galactic Globular Clusters. *Horace A. Smith*. **281**, 148, 62-E3 (1984)
- Color-Magnitude Photometry for the Globular Cluster NGC 288. *Edward W. Olszewski, R. Canerna, and William E. Harris*. **281**, 158, 62-E13 (1984)
- The Chemical Composition of Globular Clusters: Global Trends. *Catherine A. Pilachowski*. **281**, 614, 69-C6 (1984)
- Chromospheres and Mass Loss in Metal-deficient Giant Stars. *A. K. Dupree, L. Hartmann, and E. H. Avrett*. **281**, L37, 66-G7 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. *Paul Hertz and Jonathan E. Grindlay*. **282**, 118, 75-C2 (1984)
- The Main-Sequence Turnoff of the Metal-rich Globular Cluster NGC 6171. *G. S. Da Costa, J. R. Mould, and S. Ortolani*. **282**, 125, 75-C9 (1984)
- The Appearance, Number, and History of Highly Compact Binary Systems in Globular Clusters. *Julian H. Krolik*. **282**, 452, 80-B4 (1984)
- The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. *J. H. Krolik, A. Meiksin, and P. C. Joss*. **282**, 466, 80-C4 (1984)
- Short-Term X-Ray Variability of the Globular Cluster Source 4U 1820 - 30 (NGC 6624). *L. Stella, S. M. Kahn, and J. E. Grindlay*. **282**, 713, 82-G4 (1984)
- Determination of the Mass of Globular Cluster X-Ray Sources. *J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman*. **282**, L13, 78-A13 (1984)
- Does the Ellipticity of Clusters in the LMC Correlate with Age or Luminosity? *Sidney van den Bergh and Christopher L. Morbey*. **283**, 598, 93-D11 (1984)
- Spectroscopy over a Range of 5 Magnitudes in NGC 6752. *R. A. Bell, James E. Hesser, and R. D. Cannon*. **283**, 615, 93-F3 (1984)
- A Unified N-Body and Statistical Treatment of Stellar Dynamics. II. Applications to Globular Cluster Cores. *Stephen L. W. McMillan and Alan P. Lightman*. **283**, 813, 95-G1 (1984)
- Kinematics of Galactic Globular Clusters. *A. W. Rodgers and G. Paltoglou*. **283**, L5, 91-E8 (1984)
- Color-Magnitude Diagram Photometry of the LMC Red Cluster NGC 1978. *Edward W. Olszewski*. **284**, 108, 99-B11 (1984)
- Optical Counterparts for X-Ray Sources in M31. *D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck*. **284**, 663, 106-C8 (1984)
- Ages of Globular Clusters from Their Luminosity Functions. *Bohdan Paczyński*. **284**, 670, 106-D1 (1984)
- Effects of Encounters with Field Stars on the Evolution of Low-Mass Semidetached Binaries. *Piet Hut and Bohdan Paczyński*. **284**, 675, 106-D6 (1984)
- Globular Cluster Swapping in Clusters of Galaxies. *J. C. Muzzio, R. E. Martinez, and M. Rabotti*. **285**, 7, 110-A12 (1984)
- IUE Observations of the Clusters of the Magellanic Clouds. *J. G. Cohen, R. M. Rich, and S. E. Persson*. **285**, 595, 118-A12 (1984)
- Infrared Photometry of Globular Clusters in M31. *Michael L. Sitko*. **286**, 209, 124-C1 (1984)
- Main-Sequence Photometry of the SMC Globular Cluster Kron 3. *R. M. Rich, G. S. Da Costa, and J. R. Mould*. **286**, 517, 128-G1 (1984)
- The NGC 5128 Globular Cluster System: Star Counts in U, V, and R. *Gretchen L. H. Harris, James E. Hesser, Hugh C. Harris, and Patrick J. Curry*. **287**, 175, 134-G7 (1984)
- The NGC 5128 Globular Cluster System: A Complete Analysis of Images Using COSMOS. *Hugh C. Harris, Gretchen L. H. Harris, James E. Hesser, and Harvey T. MacGillivray*. **287**, 185, 135-A3 (1984)
- A Search for Cyanogen Variations on the Lower Giant Branch of M3. *John Norris and Graeme H. Smith*. **287**, 255, 135-F5 (1984)
- Isothermal Spheres in the Modified Dynamics. *M. Milgrom*. **287**, 571, 140-D3 (1984)
- Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. *David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm*. **287**, 586, 140-E5 (1984)
- Magnesium, Silicon, and Iron Abundances and the Cluster Metallicity Scale. *Douglas Geisler*. **287**, L85, 145-E9 (1984)
- The Globular Cluster System of the Galaxy. III. Measurements of Radial Velocity and Metallicity for 60 Clusters and a Compilation of Metallicities for 121 Clusters. *Robert Zinn and Michael J. West*. **55**, 45, 11-D4 (1984) (Abstr. in **279**, 910, 47-G1)
- BVRI Main-Sequence Photometry of the Globular Cluster M4. *Gonzalo Alcaino and William Liller*. **56**, 19, 22-B5 (1984) (Abstr. in **283**, 905, 96-F12)
- Clusters: Open**
- The Nature of the Visual Comparisons of Ap and Am Stars. *Helmut A. Abt and Octavio Cardona*. **276**, 266, 3-F10 (1984)
- A Photometric Comparison of Late-Type Cluster Supergiants in the Magellanic Clouds and the Galaxy. *P. J. McGregor and A. R. Hyland*. **277**, 149, 12-E7 (1984)
- A Search for Radial Velocity Variations in the Blue Stragglers of NGC 7789. *L. L. Stryker and B. J. Hrivnak*. **278**, 215, 26-C13 (1984)
- Ages of Intermediate-Age Magellanic Cloud Star Clusters. *Phillip J. Flower*. **278**, 582, 32-C7 (1984)
- Theoretical Zero-Age Main Sequences Applied to the Pleiades, Praesepe, and Hyades Star Clusters. *Don A. Vandenberg and Terry J. Bridges*. **278**, 679, 33-C14 (1984)
- The Blue Stragglers of M67. *Ruth C. Peterson, Bruce W. Carney, and David W. Latham*. **279**, 237, 39-E13 (1984)
- Optical and Infrared Photometry of Late-Type Stars in the Pleiades. *John R. Stauffer*. **280**, 189, 51-B3 (1984)
- Rotational Velocities of Low-Mass Stars in the Pleiades. *John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham*. **280**, 202, 51-C4 (1984)
- The Clusters of M33. *J. G. Cohen, S. E. Persson, and L. Searle*. **281**, 141, 62-D10 (1984)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. *F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana*. **281**, 815, 71-D5 (1984)
- The Abundance of Lithium in the Old Galactic Cluster NGC 7789. *Catherine A. Pilachowski, Jeremy R. Mould, and Michael J. Siegel*. **282**, L17, 78-B7 (1984)
- The Lithium Abundance of Hyades Main-Sequence Stars. *Roger Cayrel, Giusa Cayrel de Strobel, Bruce Campbell, and Werner Däppen*. **283**, 205, 88-C5 (1984)
- Color Anomalies and Starspots in Hyades Dwarfs. *Bruce Campbell*. **283**, 209, 88-C9 (1984)
- The Clusters NGC 419 and NGC 416 in the Wing of the Small Magellanic Cloud. *Daniel Durand, Eduardo Hardy, and Jorge Melnick*. **283**, 552, 92-G7 (1984)
- Properties of R136a as Derived from Its Optical Light Distribution. *You-Hua Chu, Joseph P. Cassinelli, and Mark G. Wolfire*. **283**, 560, 93-A4 (1984)
- Does the Ellipticity of Clusters in the LMC Correlate with Age or Luminosity? *Sidney van den Bergh and Christopher L. Morbey*. **283**, 598, 93-D11 (1984)
- A Low Density Molecular Cloud in the Vicinity of the Pleiades. *S. R. Federman and Robert F. Willson*. **283**, 626, 93-F14 (1984)
- Ultracompact Structure in the H II Region W49N. *J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker*. **283**, 632, 93-G6 (1984)
- The Structure and Dynamics of the Open Cluster M11. *Robert D. Mathieu*. **284**, 643, 106-B2 (1984)
- Interstellar Matter near the Pleiades. I. Optical Absorption-Line Observations and Foreground Atomic Gas. *Richard E. White*. **284**, 685, 106-E2 (1984)
- Interstellar Matter near the Pleiades. II. CH Formation. *Richard E. White*. **284**, 695, 106-E12 (1984)
- Mass Loss in O-Type Stars: Parameters Which Affect It. *C. D. Garmany and P. S. Conti*. **284**, 705, 106-F8 (1984)
- The Formation and Early Dynamical Evolution of Bound Stellar Systems. *Charles J. Lada, Michael Margulis, and David Dearborn*. **285**, 141, 111-D14 (1984)
- Abundance Estimates for the Distant Anticenter Clusters King 8 and Be 19. *C. A. Christian*. **286**, 552, 129-C1 (1984)
- Photographic Photometry of the Open Cluster NGC 7790. *Mario Pedreros, Barry F. Madore, and Wendy L. Freedman*. **286**, 563, 129-C13 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. *T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen*. **286**, 573, 129-D9 (1984)
- Yellow Giants in Young Clusters. II. A Comparison of Observation with Theory. *Edward G. Schmidt*. **287**, 261, 135-F11 (1984)
- The Nature of the Embedded Population in the Rho Ophiuchi Dark Cloud: Mid-Infrared Observations. *Charles J. Lada and Bruce A. Wilking*. **287**, 610, 140-G8 (1984)
- Main-Sequence B Stars with Strong Winds in the Core of NGC 6231.

Clusters: Open—Continued

- Derek Mass: Blair D. Savage, and Joseph P. Cassinelli. **287**, 814, 143-B9 (1984)
- The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. Erika Böhm-Vitense, Paul Hodge, and Don Boggs. **287**, 825, 143-C7 (1984)
- Magnesium, Silicon, and Iron Abundances and the Cluster Metallicity Scale. Douglas Geisler. **287**, L85, 145-E9 (1984)
- Yellow Giants in Young Clusters. I. Photometric Observations. Edward G. Schmidt. **55**, 455, 17-B8 (1984) (Abstr. in **281**, 891, 72-C4)
- The A0 Stars. Olin J. Eggen. **55**, 597, 20-A1 (1984) (Abstr. in **282**, 821, 84-A11)
- A Deep Photometric Study of IC 5146. Juan C. Forte and Ana M. Orsatti. **56**, 211, 25-B13 (1984) (Abstr. in **284**, 869, 108-E1)
- The A0 Stars: Erratum. Olin J. Eggen. **56**, 650, 33-C3 (1984) (Orig. paper in **55**, 597, 20-A1)

Cluster-Type Variables: see Stars: RR Lyrae**Comets**

- Infrared Molecular Emissions from Comets. H. A. Weaver and M. J. Mumma. **276**, 782, 10-A8 (1984)
- Comet Cernis: Icy Grains at Last? Martha S. Hanner. **277**, L75, 23-A1 (1984)
- The Friable Sponge Model of a Cometary Nucleus. M. Horanyi, T. I. Gombosi, T. E. Cravens, A. Korosmezey, K. Kecskemeti, A. F. Nagy, and K. Szego. **278**, 449, 28-G5 (1984)
- Observations of Comet IRAS-Araki-Alcock 1983d. R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer. **278**, L11, 29-C14 (1984)
- Hydrogen Production Rate from Comet Austin 1982g. P. Shih, F. Scherb, and F. L. Roesler. **279**, 453, 42-A1 (1984)
- Heat Flux Instability in Cometary and Solar Plasma. G. S. Lakhina and B. Buti. **280**, 917, 59-G5 (1984)
- Temporal and Spatial Behavior of the Ultraviolet Emissions of Comet IRAS-Araki-Alcock 1983d. P. D. Feldman, M. F. A'Hearn, and R. L. Millis. **282**, 799, 83-F14 (1984)
- Infrared Photometry of Comet Bowell and Other Comets. Michael F. A'Hearn, Elisha Dwek, and Alan T. Tokunaga. **282**, 803, 83-G4 (1984)
- Comet 1983d: A Contrast between Data from IRAS and Data from the Ground. Michael F. A'Hearn and Robert L. Millis. **282**, L43, 78-D2 (1984)
- A Radio Source Occultation Experiment with Comet Austin 1982g, with Unusual Results. Imke de Pater and Wing-H. Ip. **283**, 895, 96-F2 (1984)
- Vibrational and Rotational Excitation of CO in Comets: Nonequilibrium Calculations. G. Chin and H. A. Weaver. **285**, 858, 120-G2 (1984)
- Infrared Molecular Emissions from Comets: Erratum. H. A. Weaver and M. J. Mumma. **285**, 872, 121-A3 (1984) (Orig. paper in **276**, 782, 10-A8)
- The Effects of the Diffuse Radiation Fields Due to Multiple Scattering and Thermal Reradiation by Dust on the Dynamics and Thermodynamics of a Dusty Cometary Atmosphere. M. L. Marconi and D. A. Mendis. **287**, 445, 137-F11 (1984)

Convection

- A Convective Model for Turbulent Mixing in Rotating Convection Zones. David H. Hathaway. **276**, 316, 4-C4 (1984)
- The Role of Flux Ejection in Stellar Dynamos. E. N. Parker. **276**, 341, 4-E1 (1984)
- Convection in Pulsating Stars. III. The RR Lyrae Instability Strip. R. F. Stellingwerf. **277**, 322, 14-D7 (1984)
- Convection in Pulsating Stars. IV. Nonlinear Effects. R. F. Stellingwerf. **277**, 327, 14-D12 (1984)
- The Effect of Convection upon Charged Particle Transport in Random Magnetic Fields. James A. Earl. **278**, 825, 34-G11 (1984)
- Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan. **279**, 763, 46-B8 (1984)
- A Formula for the Shakura-Sunayev Turbulent Viscosity Parameter. V. M. Canuto, I. Goldman, and O. Hubickyj. **280**, L55, 60-E6 (1984)
- Two- and Three-Dimensional Numerical Simulations of the Core Helium Flash. Robert G. Deupree. **282**, 274, 76-G8 (1984)
- Turbulent Compressible Convection in a Deep Atmosphere. II. Two-Dimensional Results for Main-Sequence A5 and F0 Type Envelopes. Sabatino Sofia and Kwong L. Chan. **282**, 550, 81-B4 (1984)
- Two-Dimensional Compressible Convection Extending over Multiple Scale Heights. Neal E. Hurlburt, Juri Toomre, and Joseph M. Masaguer. **282**, 557, 81-B11 (1984)
- Convection in the Envelopes of Red Giants. H. M. Anita, S. M. Chitre, and D. Narasimha. **282**, 574, 81-C14 (1984)
- Convection in Pulsating Stars. V. Limit Cycle Characteristics. R. F. Stellingwerf. **284**, 712, 106-G1 (1984)

Convective Instability in a Solar Flux Tube. I. Nonlinear Calculations for an Adiabatic Inviscid Fluid. S. Sirajul Hasan. **285**, 851, 120-F9 (1984)

Magnetic Fields in the Radiative Interior of Stars. I. Thermal Shadows and Forced Convection. E. N. Parker. **286**, 666, 130-D8 (1984)

Magnetic Fields in the Radiative Interior of Stars. II. Forced Convection and the ^7Li Abundance. E. N. Parker. **286**, 677, 130-E5 (1984)

Techniques for Detecting Giant Cells Using Spatially Resolved Solar Velocity Data. Timothy M. Brown and Peter A. Gilman. **286**, 804, 131-G9 (1984)

Two- and Three-dimensional Numerical Simulations of the Hydrodynamic Phase of the Core Helium Flash. Robert G. Deupree. **287**, 268, 135-G5 (1984)

Cool Stars: see Stars: Late-Type**Cosmic Background Radiation**

The Microwave Background Temperature at 2.64 and 1.32 Millimeters. David M. Meyer and Michael Jura. **276**, L1, 5-E2 (1984)

New Limits on Small-Scale Anisotropy in the Microwave Background. Juan M. Uson and David T. Wilkinson. **277**, L1, 16-A2 (1984)

Limits to the Small-Scale Fluctuations in the Cosmic Background Radiation. E. B. Fomalont, K. I. Kellermann, and J. V. Wall. **277**, L23, 22-D4 (1984)

Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno. **278**, 150, 25-F2 (1984)

Primordial Gravitational Waves and the Blackbody Radiation Anisotropy. Peter J. Adams, Ronald W. Hellings, and Robert L. Zimmerman. **280**, L39, 60-D4 (1984)

The Spin Temperature of Atomic Hydrogen in Very Low Density Gas outside of Galaxies. William D. Watson and Shuji Deguchi. **281**, L5, 65-E6 (1984)

Limits on Astrophysical ν_e Flux at $E_\nu > 10^{19}$ eV. R. Baltrusaitis, R. Cady, G. Cassiday, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck. **281**, L9, 65-E10 (1984)

Minimal Anisotropy of the Microwave Background Radiation in the Gravitational Instability Picture. Nick Kaiser. **282**, 374, 79-B4 (1984)

Large-Scale Anisotropy of the Microwave Background and the Amplitude of Energy Density Fluctuations in the Early Universe. L. F. Abbott and Mark B. Wise. **282**, L47, 85-A4 (1984)

Small-Scale Isotropy of the Cosmic Microwave Background at 19.5 GHz. Juan M. Uson and David T. Wilkinson. **283**, 471, 92-A5 (1984)

Very Low Luminosity Active Galaxies and the X-Ray Background. Martin Elvis, Andrzej Soltan, and William C. Keel. **283**, 479, 92-A13 (1984)

Limits of Arcsecond-Scale Fluctuations in the Cosmic Microwave Background. J. E. Knoke, R. B. Partridge, M. I. Ratner, and I. I. Shapiro. **284**, 479, 104-D3 (1984)

Microwave Background Anisotropy and Hydrodynamic Formation of Large-Scale Structure. Craig J. Hogan. **284**, L1, 103-A2 (1984)

Photon Mass and Cosmic Microwave Background Anisotropy. P. De Bernardis, S. Masi, F. Melchiorri, and A. Moletti. **284**, L21, 109-A4 (1984)

Fine-Scale Anisotropy of the Cosmic Microwave Background in a Universe Dominated by Cold Dark Matter. Nicola Vittorio and Joseph Silk. **285**, L39, 121-C8 (1984)

Cosmic Background Radiation Anisotropies in Universes Dominated by Nonbaryonic Dark Matter. J. R. Bond and G. Efstathiou. **285**, L45, 121-C13 (1984)

Some Observable Effects in Relativistic Cosmology with Non-Perfect Fluids. L. J. Goicoechea and J. L. Sanz. **286**, 392, 127-C14 (1984)

The Dependence on Distance and Redshift of the Velocity Vectors of the Sun, the Galaxy, and the Local Group with Respect to Different Extragalactic Frames of Reference. G. de Vaucouleurs and W. L. Peters. **287**, 1, 133-A6 (1984)

Cosmic Rays: Abundances

On the Composition of the Stellar Winds of the Most Massive Stars: 100 M_\odot to 2200 M_\odot . D. S. P. Dearborn and J. B. Blake. **277**, 783, 20-F3 (1984)

On the Abundances of Ultraheavy Cosmic Rays. John R. Letaw, Rein Silberberg, and C. H. Tsao. **279**, 144, 38-E6 (1984)

Elemental Composition of Solar Energetic Particles. W. R. Cook, E. C. Stone, and R. E. Vogt. **279**, 827, 46-G3 (1984)

A High-Resolution Study of the Isotopes of Solar Flare Nuclei. R. A. Mewaldt, J. D. Spalding, and E. C. Stone. **280**, 892, 59-E4 (1984)

Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. G. M. Mason, G. Gloeckler, and D. Hoovstad. **280**, 902, 59-E14 (1984)

Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest. **283**, 439, 90-G5 (1984)

The Isotopic Composition of the Anomalous Low-Energy Cosmic Rays. R. A. Mewaldt, J. D. Spalding, and E. C. Stone. **283**, 450, 91-A3

- (1984)
 A Measurement of the Absolute Flux of Cosmic-Ray Electrons. *R. L. Golden, B. G. Mauger, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse*. **287**, 622, 141-A6 (1984)
 Propagation of Heavy Cosmic-Ray Nuclei. *John R. Letaw, Rein Silberberg, and C. H. Tsao*. **56**, 369, 27-F9 (1984) (Abstr. in **285**, 875, 121-A6)
- Cosmic Rays: General**
 Stimulated Compton Scattering of Hydromagnetic Waves in the Interstellar Medium. *Padma K. Shukla and John M. Dawson*. **276**, L49, 10-F7 (1984)
 On the Theory of Cosmic-Ray-Mediated Shocks with Variable Compression Ratio. *David Eichler*. **277**, 429, 15-E7 (1984)
 Search for Discrete Gamma-Ray Sources Emitting at Energies Greater than 10^{15} eV. *M. Samorski and W. Stamm*. **277**, 897, 21-G9 (1984)
 The Energy Spectrum of Electrons and Cosmic-Ray Confinement: A New Measurement and Its Interpretation. *K.-K. Tang*. **278**, 881, 35-D13 (1984)
 Estimate of Cosmic-Ray Latitudinal Gradient in 1981-1982. *R. B. Decker, S. M. Krimigis, and D. Venkatesan*. **278**, L119, 36-C7 (1984)
 The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. *J. B. G. M. Bloemen, L. Blitz, and W. Hermsen*. **279**, 136, 38-D9 (1984)
 Integral Radial Cosmic-Ray Gradients in the Solar System from 1972 to 1982. *J. A. Lockwood and W. R. Webber*. **279**, 151, 38-E13 (1984)
 The Bremsstrahlung Component of the Diffuse Galactic Gamma-Ray Emission at MeV Energies. *W. Sacher and V. Schönfelder*. **279**, 817, 46-F7 (1984)
 A Cosmic-Ray Supported Galactic Corona. *Roger A. Chevalier and Claes Fransson*. **279**, L43, 48-A12 (1984)
 The Path-Length Distribution for Galactic Cosmic-Ray Propagation: An Energy-Dependent Depletion of Short Path Lengths. *M. Garcia-Munoz, T. G. Guzik, J. A. Simpson, and J. P. Wefel*. **280**, L13, 54-D4 (1984)
 Ionic Charge State Measurements during He⁺-rich Solar Particle Events. *D. Hovestadt, G. Gloeckler, B. Klecker, and M. Scholer*. **281**, 463, 66-A6 (1984)
 Turbulent Heating in Solar Cosmic-Ray Theory. *James Weatherall*. **281**, 468, 66-A11 (1984)
 Importance of Transverse Diffusion for Cosmic-Ray Propagation. *P. Barge, J. Millet, and R. Pellat*. **284**, 817, 108-A1 (1984)
 The Interplanetary Scattering Mean Free Path: Collisionless Wave-damping Effects. *Joseph M. Davila and John S. Scott*. **285**, 400, 114-C5 (1984)
 Big Bang Cosmology, Relic Neutrinos, and Absorption of Neutrino Cosmic Rays. *T. Weiler*. **285**, 495, 116-G12 (1984)
 Monte Carlo Shock-like Solutions to the Boltzmann Equation with Collective Scattering. *Donald C. Ellison and David Eichler*. **286**, 691, 130-F5 (1984)
 A Measurement of the Absolute Flux of Cosmic-Ray Electrons. *R. L. Golden, B. G. Mauger, G. D. Badhwar, R. R. Daniel, J. L. Lacy, S. A. Stephens, and J. E. Zipse*. **287**, 622, 141-A6 (1984)
 Evidence that the Anomalous Cosmic-Ray Component is Singly Ionized. *A. C. Cummings, E. C. Stone, and W. R. Webber*. **287**, L99, 145-F8 (1984)
 Propagation of Heavy Cosmic-Ray Nuclei. *John R. Letaw, Rein Silberberg, and C. H. Tsao*. **56**, 369, 27-F9 (1984) (Abstr. in **285**, 875, 121-A6)
- Cosmology**
 Testing the Strong Equivalence Principle by Radio Ranging. *V. M. Canuto, I. Goldman, and I. I. Shapiro*. **276**, 1, 1-A6 (1984)
 Toward Verification of Large-Scale Homogeneity in Cosmology. *M. Hossein Partovi and Bahram Mashoon*. **276**, 4, 1-A9 (1984)
 Thermodynamics and Galaxy Clustering: Nonlinear Theory of High Order Correlations. *William C. Saslaw and Andrew J. S. Hamilton*. **276**, 13, 1-B4 (1984)
 Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. *E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin*. **276**, 403, 6-A5 (1984)
 Optical Characteristics of Young Quasars as Sources of the Cosmic X-Ray Background. *Elihu Boldt and Darryl Leiter*. **276**, 427, 6-C2 (1984)
 An Exact Closed Equation for the Cosmological Pair Correlation. *Henry E. Kandrup and Susan Hill Kandrup*. **277**, 1, 11-A6 (1984)
 Cosmological Consequences of Population III Stars. *B. J. Carr, J. R. Bond, and W. D. Arnett*. **277**, 445, 17-A5 (1984)
 Dark Matter and the Origin of Galaxies and Globular Star Clusters. *P. J. E. Peebles*. **277**, 470, 17-C2 (1984)
 Spacetime Thermodynamics and the Inflationary Universe. *T. W. Kephart, Y. J. Ng, and H. van Dam*. **277**, 478, 17-C10 (1984)
 The Distances and Properties of a Sample of Sc I Galaxies. *Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould*. **278**, 475, 31-B9 (1984)
 Alignments of Clusters of Galaxies as a Probe for Superclusters. *Avishai Dekel, Michael J. West, and Sverre J. Aarseth*. **279**, 1, 37-A6 (1984)
 The Galaxy Correlation Hierarchy in Perturbation Theory. *J. N. Fry*. **279**, 499, 43-C11 (1984)
 Mass-to-Light Ratios for Binary Pairs of Dwarf Irregular Galaxies. *George Lake and R. A. Schommer*. **279**, L19, 42-E5 (1984)
 Imperfect Fluid Cosmologies with Thermodynamics: Some Exact Solutions. *A. A. Coley and B. O. J. Tupper*. **280**, 26, 49-C6 (1984)
 Molecules in the Early Universe. *Stephen Lepp and Michael Shull*. **280**, 465, 55-A5 (1984)
 Supercluster-Supercluster Interactions. *Edward J. Shaya*. **280**, 470, 55-A10 (1984)
 Self-similar Gravitational Collapse in an Expanding Universe. *James A. Fillmore and Peter Goldreich*. **281**, 1, 61-A6 (1984)
 Self-similar Spherical Voids in an Expanding Universe. *James A. Fillmore and Peter Goldreich*. **281**, 9, 61-A14 (1984)
 Infall of Galaxies into the Virgo Cluster and Some Cosmological Constraints. *R. Brent Tully and Edward J. Shaya*. **281**, 31, 61-C8 (1984)
 The Angular Momentum Content of Galaxies. *Edward J. Shaya and R. Brent Tully*. **281**, 56, 61-E6 (1984)
 Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. *R. Brent Tully and S. C. Wolff*. **281**, 67, 61-F3 (1984)
 Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. *J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive*. **281**, 493, 68-A5 (1984)
 Limits on Astrophysical ν_e Flux at $E_\nu > 10^{19}$ eV. *R. Baltrusaitis, R. Cady, G. Cassidy, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck*. **281**, L9, 65-E10 (1984)
 Galaxy Mass Distribution from Gravitational Light Deflection. *J. Anthony Tyson, Francisco Valdes, John F. Jarvis, and Allen P. Mills, Jr.*. **281**, L59, 73-A8 (1984)
 The Redshift Structure of the Big Bang in Inhomogeneous Cosmological Models. I. Spherical Dust Solutions. *Charles Hellaby and Kayll Lake*. **282**, 1, 74-A6 (1984)
 Firm Bounds on the Neutrino Mass from the Distribution of Dark Matter in Galaxies. *Jes Madsen and Richard I. Epstein*. **282**, 11, 74-B2 (1984)
 Minimal Anisotropy of the Microwave Background Radiation in the Gravitational Instability Picture. *Nick Kaiser*. **282**, 374, 79-B4 (1984)
 Direct Determination of Extragalactic Distances from the 21 Centimeter Line Width and the Method of "Sosies". *G. Paturol*. **282**, 382, 79-B12 (1984)
 Reheating the Intergalactic Medium under Extremal Conditions. *Richard D. Sherman*. **282**, 387, 79-C3 (1984)
 Angular Correlations of Galaxies to $B \approx 24$: Another Probe of Cosmology and Galaxy Evolution. *David C. Koo and Alexander S. Szalay*. **282**, 390, 79-C7 (1984)
 Large-Scale Anisotropy of the Microwave Background and the Amplitude of Energy Density Fluctuations in the Early Universe. *L. F. Abbott and Mark B. Wise*. **282**, L47, 85-A4 (1984)
 Cosmic Strings as Gravitational Lenses. *Alexander Vilenkin*. **282**, L51, 85-A8 (1984)
 The Spatial Correlation Function of Galaxies Confronted with Theoretical Scenarios. *Avishai Dekel and Sverre J. Aarseth*. **283**, 1, 86-A6 (1984)
 The Detectability of Population III "Jupiters". *H. Karimabadi and L. Blitz*. **283**, 169, 87-G11 (1984)
 Cosmological Evolution of Radio Sources Found at 1.4 GHz. *J. J. Condon*. **284**, 44, 98-D7 (1984)
 Tests of Cosmological Models Constrained by Inflation. *P. J. E. Peebles*. **284**, 439, 104-A5 (1984)
 Superpancakes and the Cluster Correlation Function. *Avishai Dekel*. **284**, 445, 104-A11 (1984)
 Distribution Functions of Intergalactic Clouds. *Richard D. Sherman*. **284**, 457, 104-B9 (1984)
 Microwave Background Anisotropy and Hydrodynamic Formation of Large-Scale Structure. *Craig J. Hogan*. **284**, L1, 103-A2 (1984)
 Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. *Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke*. **284**, L5, 103-A6 (1984)
 On the Spatial Correlations of Abell Clusters. *Nick Kaiser*. **284**, L9, 103-A10 (1984)
 The Evolution of Galaxies in Clusters. V. A Study of Populations since $z \sim 0.5$. *Harvey Butcher and Augustus Oemler, Jr.*. **285**, 426, 116-B6 (1984)
 Big Bang Cosmology, Relic Neutrinos, and Absorption of Neutrino Cosmic Rays. *T. Weiler*. **285**, 495, 116-G12 (1984)
 The Luminosity Scale of Cepheid Variable Stars: A Revision. *Edward G. Schmidt*. **285**, 501, 117-A4 (1984)

Cosmology—Continued

- Fine-Scale Anisotropy of the Cosmic Microwave Background in a Universe Dominated by Cold Dark Matter. *Nicola Vittorio and Joseph Silk*. **285**, L39, 121-C8 (1984)
- Cosmic Background Radiation Anisotropies in Universes Dominated by Nonbaryonic Dark Matter. *J. R. Bond and G. Efstathiou*. **285**, L45, 121-C13 (1984)
- A Distance to the Large Magellanic Cloud by Main-Sequence Fitting. *Robert A. Schommer, Edward W. Olszewski, and Marc Aaronson*. **285**, L53, 121-D11 (1984)
- Milgrom's Revision of Newton's Laws: Dynamical and Cosmological Consequences. *James E. Felten*. **286**, 3, 122-A7 (1984)
- Does the Missing Mass Problem Signal the Breakdown of Newtonian Gravity? *Jacob Bekenstein and Mordehai Milgrom*. **286**, 7, 122-A11 (1984)
- Gravitational Clustering for a Multicomponent System with a Distribution of Temperatures. *Henry E. Kandrup*. **286**, 15, 122-B5 (1984)
- Behavior of Higher Modes of Gravitational Waves and Gauge-invariant Density Perturbations in Bianchi IX Cosmological Models. *R. J. Slagter*. **286**, 379, 127-C1 (1984)
- Limits on a Stochastic Gravitational Wave Background from Observations of Terrestrial and Solar Oscillations. *S. P. Boughn and J. R. Kuhn*. **286**, 387, 127-C9 (1984)
- Some Observable Effects in Relativistic Cosmology with Non-Perfect Fluids. *L. J. Goicoechea and J. L. Sanz*. **286**, 392, 127-C14 (1984)
- Supermassive Monopole Stars. *J. N. Fry and George M. Fuller*. **286**, 397, 127-D5 (1984)
- Is There Really Evidence for Universal Rotation? *Michael F. Bientzenholz and Philipp K. Kronberg*. **287**, L1, 138-C3 (1984)
- The Shane-Wirtanen Counts. *Margaret J. Geller, Valerie de Lapparent, and Michael J. Kurtz*. **287**, L55, 145-C2 (1984)
- Planar Numerical Cosmology. II. The Difference Equations and Numerical Tests. *Joan Centrella and James R. Wilson*. **54**, 229, 4-F8 (1984) (Abstr. in **276**, 798, 10-B10)
- A Comparison of Distance Scales for Early-Type Galaxies. *G. de Vaucouleurs and D. W. Olson*. **56**, 91, 22-G10 (1984) (Abstr. in **283**, 907, 96-F14)

Dense Matter

- Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. *M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham*. **276**, 325, 4-C13 (1984)
- Electrical and Thermal Conductivities of Dense Matter in the Liquid Metal Phase. II. Low-Temperature Quantum Corrections. *Shinichi Mitake, Setsuo Ichimaru, and Naoki Itoh*. **277**, 375, 15-A4 (1984)
- Screening Potential Enhancement of Thermonuclear Reaction Rate due to Relativistic Degenerate Electrons in Dense Multi-ionic Plasmas. *Setsuo Ichimaru and Kenichi Utsumi*. **278**, 382, 28-B5 (1984)
- Vortex Creep and the Internal Temperature of Neutron Stars. II. Vela Pulsar. *M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham*. **278**, 791, 34-E5 (1984)
- Neutrino Emissivity of Interacting Quark Matter in Neutron Stars. II. Finite Neutrino Momentum Effects. *Robert C. Duncan, Stuart L. Shapiro, and Ira Wasserman*. **278**, 806, 34-F6 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. *Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama*. **279**, 413, 41-D10 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections in the Liquid Metal Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **280**, 787, 58-D9 (1984)
- Rapid Postglitch Spin-up of the Superfluid Core in Pulsars. *M. A. Alpar, Stephen A. Langer, and J. A. Sauls*. **282**, 533, 81-A1 (1984)
- Rotating Neutron Star Structure: Implications of the Millisecond Pulsar PSR 1937 + 214. *A. Ray and B. Datta*. **282**, 542, 81-A10 (1984)
- On the Accuracy of the Single-Nucleus Approximation in the Equation of State of Hot, Dense Matter. *Adam Burrows and James M. Lattimer*. **285**, 294, 113-B6 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 304, 113-C2 (1984)
- Electrical and Thermal Conductivities of Dense Matter in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 758, 119-F12 (1984)
- Enhancement of Thermonuclear Reaction Rate due to Screening by Relativistic Degenerate Electrons: Long-Range Correlation Effect. *Setsuo Ichimaru and Kenichi Utsumi*. **286**, 363, 125-G6 (1984)
- Analytical Models of Neutron Star Envelopes. *Lars Hernquist and James H. Applegate*. **287**, 244, 135-E8 (1984)
- Relativistic Electron Transport in a Quantizing Magnetic Field. *Lars Hernquist*. **56**, 325, 27-C7 (1984) (Abstr. in **285**, 875, 121-A6)

Deuterium

- Deuterium Fractionation Mechanisms in Interstellar Clouds. *A. Dalgarno and S. Lepp*. **287**, L47, 138-F5 (1984)

Diffusion

- The Lithium Abundance: Constraints on Stellar Evolution. *G. Michaud, G. Fontaine, and G. Beaudet*. **282**, 206, 76-B10 (1984)
- Diffusion-induced Hydrogen Burning and the Evolution of DA White Dwarfs. *G. Michaud and G. Fontaine*. **283**, 787, 95-E2 (1984)
- Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. *Arthur N. Cox, Bernard J. McNamara, and William Ryan*. **284**, 250, 100-F13 (1984)

Double Stars: see **Stars: Binaries; Stars: Visual Multiples**

Early Universe

- The Galaxy Correlation Hierarchy in Perturbation Theory. *J. N. Fry*. **279**, 499, 43-C11 (1984)
- Molecules in the Early Universe. *Stephen Lepp and Michael Shull*. **280**, 465, 55-A5 (1984)
- Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. *J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive*. **281**, 493, 68-A5 (1984)
- Limits on Astrophysical ν , Flux at $E_\nu > 10^{19}$ eV. *R. Baltrusaitis, R. Cady, G. Cassiday, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck*. **281**, L9, 65-E10 (1984)
- Physical Processes in the Universe at the Epoch of the Quark-Hadron Transition. *S. A. Bonometto and M. Sakellariadou*. **282**, 372, 79-A14 (1984)

Earth: General

- Limits on a Stochastic Gravitational Wave Background from Observations of Terrestrial and Solar Oscillations. *S. P. Boughn and J. R. Kuhn*. **286**, 387, 127-C9 (1984)

Editorials: see **Notices**

Elementary Particles

- Neutrino Emissivity of Interacting Quark Matter in Neutron Stars. II. Finite Neutrino Momentum Effects. *Robert C. Duncan, Stuart L. Shapiro, and Ira Wasserman*. **278**, 806, 34-F6 (1984)
- Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. *W. Y. Chou, Kayl Lake, and J. Stone*. **281**, 560, 68-F2 (1984)
- On the Detection of Positrons via the Optical Lines of Positronium. *Jeffrey E. McClintock*. **282**, 291, 77-A12 (1984)
- Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. *Rida Farouki, Stuart L. Shapiro, and Ira Wasserman*. **284**, 282, 101-B3 (1984)
- Pair Production Rates in Mildly Relativistic, Magnetized Plasmas. *Michael L. Burns and Alice K. Harding*. **285**, 747, 119-F1 (1984)
- Supermassive Monopole Stars. *J. N. Fry and George M. Fuller*. **286**, 397, 127-D5 (1984)
- Limits from the Soft X-Ray Background on the Temperature of Old Neutron Stars and on the Flux of Superheavy Magnetic Monopoles. *Edward W. Kolb and Michael S. Turner*. **286**, 702, 130-G2 (1984)

Equation of State

- Statistical Mechanics of Light Elements at High Pressure. VI. Liquid-State Calculations with Thomas-Fermi-Dirac Theory. *J. J. MacFarlane*. **280**, 339, 52-E3 (1984)
- Rotating Neutron Star Structure: Implications of the Millisecond Pulsar PSR 1937 + 214. *A. Ray and B. Datta*. **282**, 542, 81-A10 (1984)
- On the Accuracy of the Single-Nucleus Approximation in the Equation of State of Hot, Dense Matter. *Adam Burrows and James M. Lattimer*. **285**, 294, 113-B6 (1984)
- Electrical and Thermal Conductivities of Dense Matter in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 758, 119-F12 (1984)

Equations: see **Functions: Numerical Methods**

Errata and Addenda

- Einstein Observations of X-Ray Emission from A Stars: Erratum. *L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr.* **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- Interstellar Polarization, Grain Growth, and Alignment: Erratum. *Per A. Aannestad and J. Mayo Greenberg*. **278**, 893, 35-E11 (1984) (Orig. paper in **272**, 551, 107-G6)
- Core Collapse with Strong Encounters: Erratum. *Jeremy Goodman*. **278**, 893, 35-E11 (1984) (Orig. paper in **270**, 700, 85-F10)
- A Static Model of Chromospheric Heating in Solar Flares: Erratum. *Paul J. Ricchiazzi and Richard C. Canfield*. **279**, 463, 42-A11 (1984) (Orig. paper in **272**, 739, 109-G5)
- Stochastic Self-propagating Star Formation in Three-dimensional Disk Galaxy Simulations: Erratum. *Thomas Statler, Neil Comins, and Bruce Smith*. **280**, 937, 60-B1 (1984) (Orig. paper in **270**, 79, 77-G3)
- Nonlinear Evolution of Superclusters: Erratum. *A. R. Rivolo and A.*

- Yahil*. **281**, 886, 72-B10 (1984) (Orig. paper in **274**, 474, 130-C8)
- X-Ray Observations of M33 with the High Resolution Imager on the Einstein Observatory: Erratum. *Thomas H. Markert and Andrew D. Rallis*. **282**, 359, 77-F9 (1984) (Orig. paper in **275**, 571, 143-F14)
- On the Propagation of Acoustic Waves in a Radiating Fluid: Addendum. *Dimitri Mihalas and Barbara Weibel Mihalas*. **283**, 469, 91-B10 (1984) (Orig. paper in **273**, 355, 116-B6)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- Explosive Nucleosynthesis and Type I Supernovae: Erratum. *K. Nomoto, F.-K. Thielemann, and J. C. Wheeler*. **283**, L25, 91-F12 (1984) (Orig. paper in **279**, L23, 42-E9)
- Infrared Molecular Emissions from Comets: Erratum. *H. A. Weaver and M. J. Mumma*. **285**, 872, 121-A3 (1984) (Orig. paper in **276**, 782, 10-A8)
- A Photometric Study of Heat Flow at the Solar Photosphere: Erratum. *P. Foukal and L. Fowler*. **286**, 377, 126-A7 (1984) (Orig. paper in **281**, 442, 65-F7)
- Ultraviolet and Optical Studies of Binaries with Luminous Cool Primaries and Hot Companions. III. Reticon Radial Velocities: Erratum. *Sidney B. Parsons*. **54**, 372, 6-C10 (1984) (Orig. paper in **53**, 553, 24-E1)
- Groups of Galaxies. III. The CfA Survey: Erratum. *M. J. Geller and J. P. Huchra*. **54**, 442, 7-F13 (1984) (Orig. paper in **52**, 61, 10-A2)
- The A0 Stars: Erratum. *Olin J. Eggen*. **56**, 650, 33-C3 (1984) (Orig. paper in **55**, 597, 20-A1)
- Excitation and Ionization: see **Atomic Processes**
- Forbidden Lines:** see **Atomic Processes**
- f-Values:** see **Transition Probabilities**
- Galaxies: Clustering**
- Thermodynamics and Galaxy Clustering: Nonlinear Theory of High Order Correlations. *William C. Saslaw and Andrew J. S. Hamilton*. **276**, 13, 1-B4 (1984)
- Relaxation and Tidal Stripping in Rich Clusters of Galaxies. II. Evolution of the Luminosity Distribution. *David Merritt*. **276**, 26, 1-C3 (1984)
- The Structure of Clusters of Galaxies Observed with Einstein. *C. Jones and W. Forman*. **276**, 38, 1-D1 (1984)
- Optical Line Emission Associated with the Radio Galaxy 4C 26.42 in the Cluster of Galaxies Abell 1795. *Wil van Breugel, Timothy Heckman, and George Miley*. **276**, 79, 1-F14 (1984)
- The Evolution of Clusters of Galaxies. II. Tidal Stripping versus Mergers as a Function of Richness. *Eliot M. Malumuth and Douglas O. Richstone*. **276**, 413, 6-B2 (1984)
- An Exact Closed Equation for the Cosmological Pair Correlation. *Henry E. Kandrup and Susan Hill Kandrup*. **277**, 1, 11-A6 (1984)
- Clusters of Galaxies as a Probe of the Intergalactic Medium. *W. Forman, C. Jones, and W. Tucker*. **277**, 19, 11-B10 (1984)
- A Supercluster Catalog. *Neta A. Bahcall and Raymond M. Soneira*. **277**, 27, 11-C4 (1984)
- N-Body Simulations of Small Groups of Galaxies. *G. Giuricin, F. Mardirossian, M. Mezzetti, and P. Santangelo*. **277**, 38, 11-D1 (1984)
- Galaxy N-Point Correlation Functions: Theoretical Amplitudes for Arbitrary N. *J. N. Fry*. **277**, L5, 16-A5 (1984)
- A Large Quasar Inhomogeneity on the Sky. *Halton Arp*. **277**, L27, 22-D8 (1984)
- Host Galaxies of Quasars and Their Association with Galaxy Clusters. *T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff*. **278**, 11, 24-B2 (1984)
- What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen*. **278**, 37, 24-D6 (1984)
- The Bright End of the Color-Magnitude Relation for Early-Type Galaxies in Clusters. *Phyllis M. Lugger*. **278**, 51, 24-E6 (1984)
- Constraints on the Anisotropy of the Velocity Dispersion of the Coma Cluster. *Carlton Pryor and Margaret J. Geller*. **278**, 457, 31-A5 (1984)
- On Galaxy Interactions during Violent Relaxation of Clusters. *A. J. Allen and S. Yabushita*. **278**, 468, 31-B2 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). *E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier*. **278**, L75, 30-C9 (1984)
- Gravitational Imaging by Superclusters. *R. H. Sanders, T. S. van Albada, and T. A. Oosterloo*. **278**, L91, 36-A8 (1984)
- Alignments of Clusters of Galaxies as a Probe for Superclusters. *Avishai Dekel, Michael J. West, and Sverre J. Aarseth*. **279**, 1, 37-A6 (1984)
- Constraints on the Orbits of Multiple Nuclei in Brightest Cluster Galaxies. *John L. Tonry*. **279**, 13, 37-B5 (1984)
- Temperature and Elemental Abundances in the Abell Cluster A576 Derived from X-Ray Observations. *R. Rothenflug, L. Vigroux, R. F. Mushotzky, and S. S. Holt*. **279**, 53, 37-E6 (1984)
- The Galaxy Correlation Hierarchy in Perturbation Theory. *J. N. Fry*. **279**, 499, 43-C11 (1984)
- On the X-Ray Spectrum of the Volume Emissivity Arising from Abell Clusters. *A. R. Stottlemeyer and E. A. Boldt*. **279**, 511, 43-D9 (1984)
- Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. *A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda*. **279**, 515, 43-D13 (1984)
- The X-Ray Luminosity Function of Abell Clusters at a Redshift of 0.25. *J. Patrick Henry and Russell J. Lavery*. **280**, 1, 49-A6 (1984)
- Digital Surface Photometry of Galaxies toward a Quantitative Classification. III. A Mean Concentration Index as a Parameter Representing the Luminosity Distribution. *S. Okamura, K. Kodaira, and M. Watanabe*. **280**, 7, 49-A13 (1984)
- Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. *G. Des Forêts, R. Dominguez-Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solé*. **280**, 15, 49-B9 (1984)
- An Imaging Survey of Fields around Quasars. II. The Association of Galaxies with Quasars. *H. K. C. Yee and Richard F. Green*. **280**, 79, 49-G10 (1984)
- Supercluster-Supercluster Interactions. *Edward J. Shaya*. **280**, 470, 55-A10 (1984)
- Infrared Photometry and Optical Spectroscopy of Dwarf Galaxies in the Virgo Cluster. *Gregory D. Bothun and C. Nelson Caldwell*. **280**, 528, 55-E13 (1984)
- The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. *D. E. Harris, C. H. Costain, and P. E. Dewdney*. **280**, 532, 55-F3 (1984)
- The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. *K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus*. **280**, 542, 55-F13 (1984)
- A Galaxy Cluster behind M87. *John Huchra and Jean Brodie*. **280**, 547, 55-G4 (1984)
- The Nature of Multiple-Nucleus Cluster Galaxies. *David Merritt*. **280**, L5, 54-C6 (1984)
- 3C 324—An Extremely Distant Cluster Radio Galaxy. *Hyron Spinrad and S. Djorgovski*. **280**, L9, 54-C11 (1984)
- The Luminosity Function of Seyfert Galaxies and the Cluster 3C 295. *Donald E. Osterbrock*. **280**, L43, 60-D7 (1984)
- Infall of Galaxies into the Virgo Cluster and Some Cosmological Constraints. *R. Brent Tully and Edward J. Shaya*. **281**, 31, 61-C8 (1984)
- The Angular Momentum Content of Galaxies. *Edward J. Shaya and R. Brent Tully*. **281**, 56, 61-E6 (1984)
- Internal Kinematics of Galaxies in Clusters. I. Velocity Dispersions for Elliptical Galaxies in Coma and Virgo. *Alan Dressler*. **281**, 512, 68-B10 (1984)
- Nonlinear Evolution of Superclusters: Erratum. *A. R. Rivolo and A. Yahil*. **281**, 886, 72-B10 (1984) (Orig. paper in **274**, 474, 130-C8)
- Massive Neutrinos and the Pancake Theory of Galaxy Formation. *Richard Schaeffer and Joseph Silk*. **281**, L13, 65-E14 (1984)
- Firm Bounds on the Neutrino Mass from the Distribution of Dark Matter in Galaxies. *Jes Madsen and Richard I. Epstein*. **282**, 11, 74-B2 (1984)
- Velocity Distribution of Virgo Cluster Galaxies. *Christ Fiacas, Michael N. Fanelli, and Mitchell F. Struble*. **282**, 19, 74-B10 (1984)
- Angular Correlations of Galaxies to $B = 24$: Another Probe of Cosmology and Galaxy Evolution. *David C. Koo and Alexander S. Szalay*. **282**, 390, 79-C7 (1984)
- The Spatial Correlation Function of Galaxies Confronted with Theoretical Scenarios. *Avishai Dekel and Sverre J. Aarseth*. **283**, 1, 86-A6 (1984)
- The Effect of the Perturbation of the Local Velocity Field by Virgo on the Calculation of Differential Luminosity Functions. *R. G. Kraan-Korteweg, Allan Sandage, and G. A. Tammann*. **283**, 24, 86-C7 (1984)
- Seven Poor Clusters of Galaxies. *Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis*. **283**, 33, 86-D3 (1984)
- The Statistics of Gravitational Lenses: The Distributions of Image Angular Separations and Lens Redshifts. *Edwin L. Turner, Jeremiah P. Ostriker, and Richard J. Gott III*. **284**, 1, 98-A6 (1984)
- Superpancakes and the Cluster Correlation Function. *Avishai Dekel*. **284**, 445, 104-A11 (1984)
- 1.4 GHz Continuum Sources in the Hercules Cluster. *J. M. Dickey and E. E. Salpeter*. **284**, 461, 104-B13 (1984)
- Spin Statistics in Binary Galaxies: Implications for Formation and Evolution. *George Helou*. **284**, 471, 104-C9 (1984)
- On the Spatial Correlations of Abell Clusters. *Nick Kaiser*. **284**, L9,

Galaxies: Clustering—Continued

- 103-A10 (1984)
- X-Ray Emission from Stephan's Quintet and Other Compact Groups. *Neftci A. Bahcall, D. E. Harris, and Herbert J. Rood.* **284**, L29, 109-A12 (1984)
- The Prevalence of Cooling Flows in Clusters of Galaxies. *G. C. Stewart, A. C. Fabian, C. Jones, and W. Forman.* **285**, 1, 110-A6 (1984)
- Globular Cluster Swapping in Clusters of Galaxies. *J. C. Muzio, R. E. Martinez, and M. Rabolli.* **285**, 7, 110-A12 (1984)
- On the Characteristics of Clusters of Galaxies with Unseen Mass. *Haywood Smith, Jr.* **285**, 16, 110-B7 (1984)
- The Evolution of Galaxies in Clusters. V. A Study of Populations since $z \sim 0.5$. *Harvey Butcher and Augustus Oemler, Jr.* **285**, 426, 116-B6 (1984)
- Relations between Spatial Correlations of Rich Clusters of Galaxies. *H. David Politzer and Mark B. Wise.* **285**, L1, 114-F3 (1984)
- The Intergalactic H I Cloud in Leo: A Spitzer-Baade Collision Product? *Herbert J. Rood and B. A. Williams.* **285**, L5, 114-F6 (1984)
- Milgrom's Revision of Newton's Laws: Dynamical and Cosmological Consequences. *James E. Felten.* **286**, 3, 122-A7 (1984)
- Gravitational Clustering for a Multicomponent System with a Distribution of Temperatures. *Henry E. Kandrup.* **286**, 15, 122-B5 (1984)
- The Structure of First-Ranked Cluster Galaxies and the Radius-Magnitude Relation. *Phyllis M. Lugger.* **286**, 106, 123-A14 (1984)
- X-Ray Measurements of the Nonspherical Mass Distribution in the Cluster of Galaxies A2256. *D. Fabricant, G. Rybicki, and P. Gorenstein.* **286**, 186, 124-A6 (1984)
- The A2197 and A2199 Galaxy Clusters. *Stephen A. Gregory and Laird A. Thompson.* **286**, 422, 127-F4 (1984)
- Double Galaxy Redshifts and Dynamical Analyses. *N. A. Sharp.* **286**, 437, 127-G5 (1984)
- Redshift Differentials in a Complete Sample of Galaxy Groups. *Jack W. Sulentic.* **286**, 442, 127-G12 (1984)
- CCD Observations of Galaxies in Clusters at High Redshift. *R. Schild.* **286**, 450, 128-A6 (1984)
- The Dependence on Distance and Redshift of the Velocity Vectors of the Sun, the Galaxy, and the Local Group with Respect to Different Extragalactic Frames of Reference. *G. de Vaucouleurs and W. L. Peters.* **287**, 1, 133-A6 (1984)
- A Complete Sample of Southern E and S0 Galaxies: Clustering Properties. *E. M. Sadler and N. A. Sharp.* **287**, 80, 133-G6 (1984)
- The Radial X-Ray Brightness Profile of the Coma Cluster. *Gary A. Chanan and Frank Abramopoulos.* **287**, 89, 134-A1 (1984)
- Interacting Binary Galaxies. I. A Numerical Model and Preliminary Results. *Kirk D. Borne.* **287**, 503, 139-F2 (1984)
- Isothermal Spheres in the Modified Dynamics. *M. Milgrom.* **287**, 571, 140-D3 (1984)
- The Shane-Wirtanen Counts. *Margaret J. Geller, Valerie de Lapparent, and Michael J. Kurtz.* **287**, L55, 145-C2 (1984)
- A Statistical Comparison of Voids in the Galaxy Distribution of n -Body Simulations. *Barbara S. Ryden and Edwin L. Turner.* **287**, L59, 145-C9 (1984)
- Groups of Galaxies. III. The CfA Survey: Erratum. *M. J. Geller and J. P. Huchra.* **54**, 442, 7-F13 (1984) (Orig. paper in **52**, 61, 10-A2)
- An Imaging Survey of Fields around Quasars. I. A Catalog. *Richard F. Green and H. K. C. Yee.* **54**, 495, 8-E5 (1984) (Abstr. in **278**, 895, 35-E13)
- H I Observations in the Virgo Cluster Area. II. A Complete, Magnitude-Limited Sample of Spiral Galaxies. *George Helou, G. Lyle Hoffman, and E. E. Salpeter.* **55**, 433, 17-A1 (1984) (Abstr. in **281**, 890, 72-C3)
- Wide-Angle Radio Tail QSOs as Members of Clusters of Galaxies. II. Direct Optical Observations and Spectroscopy of QSO Fields. *Paul Hintzen.* **55**, 533, 18-A1 (1984) (Abstr. in **281**, 891, 72-C4)
- Distant Clusters of Galaxies. I. Uniform Photometry of Rich Clusters. *Warrick J. Couch and E. B. Newell.* **56**, 143, 23-E1 (1984) (Abstr. in **283**, 907, 96-F14)
- An X-Ray Survey of Clusters of Galaxies. IV. A Survey of Southern Clusters and a Compilation of Upper Limits for Both Abell and Southern Galaxies. *M. P. Kowalski, M. P. Ulmer, R. G. Craddock, and K. S. Wood.* **56**, 403, 29-A9 (1984) (Abstr. in **286**, 822, 132-A13)
- Galaxies: Evolution**
- Relaxation and Tidal Stripping in Rich Clusters of Galaxies. II. Evolution of the Luminosity Distribution. *David Merritt.* **276**, 26, 1-C3 (1984)
- The Evolution of Clusters of Galaxies. II. Tidal Stripping versus Mergers as a Function of Richness. *Eliot M. Malumuth and Douglas O. Richstone.* **276**, 413, 6-B2 (1984)
- Formation of Dissipative Structures in Galaxies. *Toshiya Nozakura and Satoru Ikeuchi.* **279**, 40, 37-D5 (1984)
- The X-Ray Luminosity Function of Abell Clusters at a Redshift of 0.25. *J. Patrick Henry and Russell J. Lavery.* **280**, 1, 49-A6 (1984)
- The Angular Momentum Content of Galaxies. *Edward J. Shaya and R. Brent Tully.* **281**, 56, 61-E6 (1984)
- Angular Correlations of Galaxies to $B \approx 24$: Another Probe of Cosmology and Galaxy Evolution. *David C. Koo and Alexander S. Szalay.* **282**, 390, 79-C7 (1984)
- Cosmological Evolution of Radio Sources Found at 1.4 GHz. *J. J. Condon.* **284**, 44, 98-D7 (1984)
- X-Ray Observations of Spiral Galaxies. I. Integrated Properties. *G. Fabbiano, G. Trinchieri, and A. Macdonald.* **284**, 65, 98-E14 (1984)
- Star Formation Histories of Irregular Galaxies. *John S. Gallagher III, Deidre A. Hunter, and Alexander V. Tutukov.* **284**, 544, 105-A12 (1984)
- Galactic Chemical Evolution and Nucleocosmochronology: Standard Model with Terminated Infall. *Donald D. Clayton.* **285**, 411, 116-A5 (1984)
- The Evolution of Galaxies in Clusters. V. A Study of Populations since $z \sim 0.5$. *Harvey Butcher and Augustus Oemler, Jr.* **285**, 426, 116-B6 (1984)
- Gravitational Clustering for a Multicomponent System with a Distribution of Temperatures. *Henry E. Kandrup.* **286**, 15, 122-B5 (1984)
- The Velocity Dispersion in the Disk of the SB0 Galaxy NGC 936. *John Kormendy.* **286**, 132, 123-D1 (1984)
- Stochastic Models for the Evolution of Open Stellar Systems. *Federico Ferrini and Fabio Marchesoni.* **287**, 17, 133-B10 (1984)
- Galaxies: Formation**
- Relaxation and Tidal Stripping in Rich Clusters of Galaxies. II. Evolution of the Luminosity Distribution. *David Merritt.* **276**, 26, 1-C3 (1984)
- Dark Matter and the Origin of Galaxies and Globular Star Clusters. *P. J. E. Peebles.* **277**, 470, 17-C2 (1984)
- Are Cosmologically Distant Objects Obscured by Dust? A Test Using Quasars. *J. P. Ostriker and J. Heister.* **278**, 1, 24-A6 (1984)
- On Galaxy Interactions during Violent Relaxation of Clusters. *A. J. Allen and S. Yabushita.* **278**, 468, 31-B2 (1984)
- Alignments of Clusters of Galaxies as a Probe for Superclusters. *Avishai Dekel, Michael J. West, and Sverre J. Aarseth.* **279**, 1, 37-A6 (1984)
- Mass-to-Light Ratios for Binary Pairs of Dwarf Irregular Galaxies. *George Lake and R. A. Schommer.* **279**, L19, 42-E5 (1984)
- Dissipationless Collapse of Galaxies and Initial Conditions. *Thomas A. McGlynn.* **281**, 13, 61-B4 (1984)
- Infall of Galaxies into the Virgo Cluster and Some Cosmological Constraints. *R. Brent Tully and Edward J. Shaya.* **281**, 31, 61-C8 (1984)
- The Angular Momentum Content of Galaxies. *Edward J. Shaya and R. Brent Tully.* **281**, 56, 61-E6 (1984)
- The Morphology-Density Relation: The Group Connection. *M. Postman and M. J. Geller.* **281**, 95, 62-A6 (1984)
- Galaxies from Poisson Fluctuations. *Richard I. Epstein.* **281**, 545, 68-E1 (1984)
- Massive Neutrinos and the Pancake Theory of Galaxy Formation. *Richard Schaeffer and Joseph Silk.* **281**, L13, 65-E14 (1984)
- The Spatial Correlation Function of Galaxies Confronted with Theoretical Scenarios. *Avishai Dekel and Sverre J. Aarseth.* **283**, 1, 86-A6 (1984)
- Violent Relaxation and Dissipationless Collapse. *Jens Verner Villumsen.* **284**, 75, 98-F11 (1984)
- Superpancakes and the Cluster Correlation Function. *Avishai Dekel.* **284**, 445, 104-A11 (1984)
- Spin Statistics in Binary Galaxies: Implications for Formation and Evolution. *George Helou.* **284**, 471, 104-C9 (1984)
- Cosmic Background Radiation Anisotropies in Universes Dominated by Nonbaryonic Dark Matter. *J. R. Bond and G. Efsthathiou.* **285**, L45, 121-C13 (1984)
- Angular Momentum Growth in Protogalaxies. *Simon D. M. White.* **286**, 38, 122-C14 (1984)
- Dissipative Formation of an Elliptical Galaxy. *R. G. Carlberg.* **286**, 403, 127-D11 (1984)
- Dissipative Models for the Sequence of Elliptical Galaxies. *R. G. Carlberg.* **286**, 416, 127-E12 (1984)
- Stochastic Models for the Evolution of Open Stellar Systems. *Federico Ferrini and Fabio Marchesoni.* **287**, 17, 133-B10 (1984)
- The Broad Absorption Lines in the Spectrum of the QSO PKS 1157 + 014: A Possible Link between Broad Absorption Line QSOs, Metal Enrichment, and the Formation of Galaxies. *F. H. Briggs, D. A. Turnshek, and A. M. Wolfe.* **287**, 549, 140-B8 (1984)
- A Statistical Comparison of Voids in the Galaxy Distribution of n -Body Simulations. *Barbara S. Ryden and Edwin L. Turner.* **287**, L59, 145-C9 (1984)
- Galaxies: General**
- Anomalous Emission Regions in Irregular Galaxies. *Deidre A. Hunter.* **276**, L35, 10-E7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. *T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H.*

- Aumann, and E. Raimond.* **278**, L67, 30-C1 (1984)
 Mass-to-Light Ratios for Binary Pairs of Dwarf Irregular Galaxies. *George Lake and R. A. Schommer.* **279**, L19, 42-E5 (1984)
 Splitting of C IV Lines in a QSO Absorption-Line System. *D. G. York, Richard F. Green, Jill Bechtold, and Frederic H. Chaffee, Jr.* **280**, L1, 54-C2 (1984)
 Luminosity-dependent Line Ratios in Disks of Spiral Galaxies. *Vera C. Rubin, W. Kent Ford, Jr., and Bradley C. Whitmore.* **281**, L21, 65-F6 (1984)
 A Probable Supernova Remnant in the Dwarf Elliptical Galaxy NGC 185. *John S. Gallagher III, Deidre A. Hunter, and Jeremy Mould.* **281**, L63, 73-A12 (1984)
 Velocity Dispersions of Disk Stars in Spiral Galaxies. *John N. Bahcall and Stefano Casert.* **284**, L35, 109-B5 (1984)
 The Intergalactic H I Cloud in Leo: A Spitzer-Baade Collision Product? *Herbert J. Rood and B. A. Williams.* **285**, L5, 114-F6 (1984)
 CO Emission from IRAS Galaxies. *Judith S. Young, Jeffrey Kenney, Steven D. Lord, and F. Peter Schloerb.* **287**, L65, 145-C14 (1984)
 The Case Low-Dispersion Northern Sky Survey. II. *N. Sanduleak and Peter Pesch.* **55**, 517, 17-F13 (1984) (Abstr. in **281**, 892, 72-C5)
- Galaxies: Individual** (arranged by Messier Number, NGC Number, and by Other Designation)
- By Messier Number*
- IUE* and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti.* **278**, 124, 25-D2 (1984)
 [M31] The Infrared Ca II Triplet: A Luminosity Indicator for Stellar Population Synthesis. *Janet E. Jones, Danielle M. Alloin, and Bernard J. T. Jones.* **283**, 457, 91-A11 (1984)
 Optical Counterparts for X-Ray Sources in M31. *D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck.* **284**, 663, 106-C8 (1984)
 Infrared Photometry of Globular Clusters in M31. *Michael L. Sitko.* **286**, 209, 124-C1 (1984)
 On the Structure of the Nucleus of M31. *Jean-Luc Nieto.* **287**, 108, 134-B6 (1984)
 Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. *David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm.* **287**, 586, 140-E5 (1984)
IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti.* **278**, 124, 25-D2 (1984)
 The Clusters of M33. *J. G. Cohen, S. E. Persson, and L. Searle.* **281**, 141, 62-D10 (1984)
 X-Ray Observations of M33 with the High Resolution Imager on the Einstein Observatory: Erratum. *Thomas H. Markert and Andrew D. Rallis.* **282**, 359, 77-F9 (1984) (Orig. paper in **275**, 571, 143-F14)
 Spatially Resolved High-Velocity Outflow from the Nucleus of M51. *Gerald Cecil and James A. Rose.* **287**, 131, 134-D2 (1984)
 The Molecular Halo of M82. *Antony A. Stark and Eric R. Carlson.* **279**, 122, 38-C9 (1984)
 Imaging Spectrophotometric Observations of the Ionized Hydrogen Associated with M82. *T. B. Williams, Nelson Caldwell, and R. A. Schommer.* **281**, 579, 68-G7 (1984)
 Position-dependent Infrared Spectroscopy of M82: 100,000 Orion Nebulae? *B. Jones and J. M. Rodriguez-Espinoza.* **285**, 580, 117-G11 (1984)
 Submillimeter Continuum Observations of M82. *D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand.* **285**, L31, 115-A2 (1984)
 X-Ray Emission from M82. *M. G. Watson, V. Stanger, and R. E. Griffiths.* **286**, 144, 123-D12 (1984)
 Molecular Clouds in M82. *Judith S. Young and N. Z. Scoville.* **287**, 153, 134-E12 (1984)
 The Electron Density in M82 from the S III Mid-Infrared Line Ratio. *J. R. Houck, M. A. Shure, G. E. Gull, and T. Herter.* **287**, L11, 138-C12 (1984)
 Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). *Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York.* **281**, 585, 69-A5 (1984)
 The Mass Profile and Gas Content of M87. *G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen.* **278**, 536, 31-G1 (1984)
 Optical Spectrophotometry of the M87 Jet and Its Environs. *William C. Keel.* **279**, 550, 43-G7 (1984)
 Infrared Mapping of the M87 Jet. *N. E. B. Killeen, G. V. Bicknell, A. R. Hyland, and T. J. Jones.* **280**, 126, 50-D3 (1984)
 A Galaxy Cluster behind M87. *John Huchra and Jean Brodie.* **280**, 547, 55-G4 (1984)
 Images in the Rocket Ultraviolet: Photometry of M101. *Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher.* **277**, 542, 18-A5 (1984)
 Limits on Diffuse X-Ray Emission from M101. *D. McCammon and W. T. Sanders.* **287**, 167, 134-F13 (1984)
- By NGC Number*
- Stellar Populations in Local Group Dwarf Elliptical Galaxies. II. NGC 205. *Jeremy Mould, Jerome Kristian, and G. S. Da Costa.* **278**, 575, 32-B12 (1984)
 Luminous Late-Type Stars in NGC 205. *Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett.* **287**, 138, 134-D9 (1984)
 The Complex X-Ray Emission of NGC 253. *G. Fabbiano and G. Trinchieri.* **286**, 491, 128-D14 (1984)
 [NGC 383] 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. *J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccacaro.* **277**, 43, 11-D6 (1984)
 [NGC 628] The Vertical Velocity Dispersion of the Stars in the Disks of Two Spiral Galaxies. *P. C. van der Kruit and K. C. Freeman.* **278**, 81, 24-G11 (1984)
 The Velocity Dispersion in the Disk of the SB0 Galaxy NGC 936. *John Kormendy.* **286**, 132, 123-D1 (1984)
 Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. *Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer.* **276**, 480, 6-G3 (1984)
 Radio Continuum Activity in the Elliptical Galaxy NGC 1052. *J. M. Wrobel.* **284**, 531, 104-G13 (1984)
 The Ionization Mechanism for Gas in the Nuclei of NGC 1052 and NGC 4278. *James A. Rose and Michael J. Tripicco.* **285**, 55, 110-E9 (1984)
 A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. *C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper.* **282**, 427, 79-G4 (1984)
 Complete Quasar Search in the NGC 1097 Field. *Halton Arp, R. D. Wolstencroft, and X. T. He.* **285**, 44, 110-D7 (1984)
 On the Existence of a Dark Halo around the High-Velocity Compact Object near NGC 1199. *Merle F. Walker and Johannes Andersen.* **287**, 148, 134-E5 (1984)
 The 20 Year Spectral Evolution of the Radio Nucleus of NGC 1275. *Christopher P. O'Dea, William A. Dent, and Thomas J. Balonek.* **278**, 89, 25-A5 (1984)
 The Velocity Dispersion in the Disk of the S0 Galaxy NGC 1553. *John Kormendy.* **286**, 116, 123-B11 (1984)
 [NGC 1566] The Vertical Velocity Dispersion of the Stars in the Disks of Two Spiral Galaxies. *P. C. van der Kruit and K. C. Freeman.* **278**, 81, 24-G11 (1984)
 CO Emission from the Star-Burst Irregular Galaxy NGC 1569. *Judith S. Young, J. S. Gallagher, and Deidre A. Hunter.* **276**, 476, 6-F13 (1984)
 The Distance to NGC 2403 Based on Near-Infrared Observations of Cepheids. *Christopher W. McAlary and Barry F. Madore.* **282**, 101, 75-A13 (1984)
 [NGC 3108] Two Early-Type Galaxies with Ionized Gas Disks. *Nelson Caldwell.* **278**, 96, 25-A12 (1984)
 The 1984 Supernova in NGC 3169: Evidence for a Superwind. *Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz.* **287**, L69, 145-D7 (1984)
 Ongoing Star Formation in NGC 3310: An Infrared Perspective. *C. M. Telesco and Ian Gatley.* **284**, 557, 105-B12 (1984)
 [NGC 3842] Two Newly Discovered Quasars Closely Spaced across a Galaxy. *Halton Arp.* **283**, 59, 86-F3 (1984)
 High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. *S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley.* **286**, 471, 128-C3 (1984)
 Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. *W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini.* **279**, 555, 44-A1 (1984)
 The Variable Component of the NGC 4151 IUE Spectrum: Evidence for an Expanding Spherical Emission Shell. *Ronald Stoner, Roger Ptak, and Stephen Gregory.* **285**, 69, 110-F9 (1984)
 Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. *Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer.* **276**, 480, 6-G3 (1984)
 The Ionization Mechanism for Gas in the Nuclei of NGC 1052 and NGC 4278. *James A. Rose and Michael J. Tripicco.* **285**, 55, 110-E9 (1984)
 NGC 4650A: The Rotation of the Diffuse Stellar Component. *Paul L. Schechter, Marie-Helene Ulrich, and A. Boksenberg.* **277**, 526, 17-G3 (1984)
 High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. *S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley.* **286**, 471, 128-C3 (1984)
 A Surface Photometry of Edge-on Galaxies. V. The Vertical Structure of the Bar in NGC 4762. *Ken-ichi Wakamatsu and Masaru Hamabe.* **56**, 283, 26-B3 (1984) (Abstr. in **284**, 870, 108-E2)
 The NGC 5128 Globular Cluster System. *James E. Hesser, Hugh C. Harris, Sidney van den Bergh, and Gretchen L. H. Harris.* **276**, 491, 7-A1 (1984)
 [NGC 5128] The Gamma-Ray Spectrum of Centaurus A: A High-Reso-

Galaxies: Individual—Continued

- lution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury.* **278**, 112, 25-C4 (1984)
- The Stellar Content and Metallicity of the NGC 5128 Globular Cluster. *Jay A. Frogel.* **278**, 119, 25-C11 (1984)
- The NGC 5128 Globular Cluster System: Star Counts in U, V, and R. *Gretchen L. H. Harris, James E. Hesser, Hugh C. Harris, and Patrick J. Curry.* **287**, 175, 134-G7 (1984)
- The NGC 5128 Globular Cluster System: A Complete Analysis of Images Using COSMOS. *Hugh C. Harris, Gretchen L. H. Harris, James E. Hesser, and Harvey T. MacGillivray.* **287**, 185, 135-A3 (1984)
- Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). *Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York.* **281**, 585, 69-A5 (1984)
- [NGC 5266] Two Early-Type Galaxies with Ionized Gas Disks. *Nelson Caldwell.* **278**, 96, 25-A12 (1984)
- Recognizing Merger Remnants among Normal Elliptical Galaxies: NGC 5813. *John Kormendy.* **287**, 577, 140-D9 (1984)
- [NGC 5953] Arp 91: Interaction and Star Formation in a Galaxy Pair. *C. R. Jenkins.* **277**, 501, 17-E5 (1984)
- High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis.* **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)
- Massive Star Formation in NGC 6946. *K. DeGioia-Eastwood, G. L. Grasdale, S. E. Strom, and K. M. Strom.* **278**, 564, 32-B1 (1984)
- NGC 7213: A Key to the Nature of Liners? *Alexei V. Filippenko and J. P. Halpern.* **285**, 458, 116-D10 (1984)
- The Nonstellar Continuum of the Seyfert Galaxy NGC 7213. *J. P. Halpern and Alexei V. Filippenko.* **285**, 475, 116-E13 (1984)
- The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. *Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner.* **280**, 521, 55-E6 (1984)
- Optical Properties of the Knots in NGC 7385. *S. M. Simkin, G. V. Bicknell, and A. Bosma.* **277**, 513, 17-F3 (1984)
- [NGC 7720] What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen.* **278**, 37, 24-D6 (1984)
- By Other Designation: Names*
- Arp 91: Interaction and Star Formation in a Galaxy Pair. *C. R. Jenkins.* **277**, 501, 17-E5 (1984)
- High-Resolution Imaging from Mauna Kea: Cygnus A. *Laird A. Thompson.* **279**, 147, 48-B2 (1984)
- [Fornax Dwarf Spheroidal Galaxy] Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. *Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes.* **280**, 615, 56-E7 (1984)
- Photometry of Resolved Galaxies. IV. Holmberg I and Holmberg II. *J. G. Hoessel and G. E. Danielson.* **286**, 159, 123-E9 (1984)
- Photometry of Resolved Galaxies. IV. Holmberg I and Holmberg II. *J. G. Hoessel and G. E. Danielson.* **286**, 159, 123-E9 (1984)
- The Luminous Host Galaxy and Anomalous Brackett-Gamma Line of Markarian 231. *Roc M. Cutri, G. H. Rieke, and M. J. Lebofsky.* **287**, 566, 140-C12 (1984)
- Images and Spectra of the Host Galaxy of the QSO Markarian 1014. *John W. McKenty and Alan Stockton.* **283**, 64, 86-F9 (1984)
- The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 - 65. *R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips.* **286**, 464, 128-B10 (1984)
- The Age(s) of the Sculptor Dwarf Galaxy. *G. S. Da Costa.* **285**, 483, 116-F7 (1984)
- By Other Designation: Alphanumeric*
- The Distance to IC 1613 from Infrared Photometry of Cepheids. *Christopher W. McAlary, Barry F. Madore, and Lindsey E. Davis.* **276**, 487, 6-G10 (1984)
- The Peculiar Galaxy IC 4553: VLA-A Observations of the OH Megamaser. *Willem A. Baan and Aubrey D. Haschick.* **279**, 541, 43-F12 (1984)
- The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 - 65. *R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips.* **286**, 464, 128-B10 (1984)
- The Compact Radio Source 2021 + 614: A Peculiar Narrow-Line Radio Galaxy. *Norbert Bartel, Irwin I. Shapiro, John P. Huchra, and Helmut Kühr.* **279**, 112, 38-B13 (1984)
- Double Faraday Rotation toward 3C 27. *S. J. Goldstein, Jr. and J. A. Reed.* **283**, 540, 92-F9 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga.* **278**, 530, 31-F9 (1984)
- 3C 111: A Luminous Radio Galaxy with a Highly Collimated Jet. *Roger Linfield and Rick Perley.* **279**, 60, 37-E14 (1984)
- Emission-Line Gas Associated with the Radio Lobes of the High-Luminosity Radio Source 3C 171. *T. M. Heckman, W. J. M. van Breugel, and G. K. Miley.* **286**, 509, 128-F5 (1984)
- Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga.* **284**, 523, 104-G5 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley.* **277**, 82, 11-G5 (1984)
- Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock.* **278**, 521, 31-E14 (1984)
- What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen.* **278**, 37, 24-D6 (1984)
- 4C 2947: Quasi-periodic Outbursts Recorded by Precessing Jets? *J. J. Condon and K. J. Mitchell.* **276**, 472, 6-F8 (1984)
- Galaxies: Intergalactic Medium**
- The Structure of Clusters of Galaxies Observed with Einstein. *C. Jones and W. Forman.* **276**, 38, 1-D1 (1984)
- Clusters of Galaxies as a Probe of the Intergalactic Medium. *W. Forman, C. Jones, and W. Tucker.* **277**, 19, 11-B10 (1984)
- Are Cosmologically Distant Objects Obscured by Dust? A Test Using Quasars. *J. P. Ostriker and J. Heisler.* **278**, 1, 24-A6 (1984)
- The Mass Profile and Gas Content of M87. *G. C. Stewart, C. R. Cantizares, A. C. Fabian, and P. E. J. Nulsen.* **278**, 536, 31-G1 (1984)
- The Rotation Measure Distribution of QSOs and of Intervening Clouds: Magnetic Fields and Column Densities. *G. L. Welter, J. J. Perry, and P. P. Kronberg.* **279**, 19, 37-B11 (1984)
- The Spin Temperature of Atomic Hydrogen in Very Low Density Gas outside of Galaxies. *William D. Watson and Shuji Deguchi.* **281**, L5, 65-E6 (1984)
- Reheating the Intergalactic Medium under Extremal Conditions. *Richard D. Sherman.* **282**, 387, 79-C3 (1984)
- Limits on the Infrared and Visual Luminosity of the Intergalactic H I Cloud in Leo. *M. F. Skrutskie, M. A. Shure, and S. Beckwith.* **282**, L65, 85-B13 (1984)
- Distribution Functions of Intergalactic Clouds. *Richard D. Sherman.* **284**, 457, 104-B9 (1984)
- 1.4 GHz Continuum Sources in the Hercules Cluster. *J. M. Dickey and E. E. Salpeter.* **284**, 461, 104-B13 (1984)
- The Prevalence of Cooling Flows in Clusters of Galaxies. *G. C. Stewart, A. C. Fabian, C. Jones, and W. Forman.* **285**, 1, 110-A6 (1984)
- The Intergalactic H I Cloud in Leo: A Spitzer-Baade Collision Product? *Herbert J. Rood and B. A. Williams.* **285**, L5, 114-F6 (1984)
- On the Existence of a Dark Halo around the High-Velocity Compact Object near NGC 1199. *Merle F. Walker and Johannes Andersen.* **287**, 148, 134-E5 (1984)
- Galaxies: Internal Motions**
- Continuum Models for Gas in Disturbed Galaxies. I. Model Equations. *John M. Scalo and Curtis Struck-Marcell.* **276**, 60, 1-E9 (1984)
- Preferred Orbit Planes in Triaxial Galaxies. I. Tumbling about a Principal Axis. *Thomas Y. Steiman-Cameron and Richard H. Durisen.* **276**, 101, 2-A10 (1984)
- Two-Fluid Gravitational Instabilities in a Galactic Disk. *Chanda J. Jog and P. M. Solomon.* **276**, 114, 2-B9 (1984)
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. *Chanda J. Jog and P. M. Solomon.* **276**, 127, 2-C8 (1984)
- The Self-consistent Response of Stellar Disks to Bar Forcing. *K. O. Thielheim and H. Wolff.* **276**, 135, 2-D2 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley.* **277**, 82, 11-G5 (1984)
- NGC 4650A: The Rotation of the Diffuse Stellar Component. *Paul L. Schechter, Marie-Helene Ulrich, and A. Boksenberg.* **277**, 526, 17-G3 (1984)
- The Propagation and Stability of Time-dependent Galactodetonation Waves. *Steven A. Balbus.* **277**, 550, 18-A14 (1984)
- The Vertical Velocity Dispersion of the Stars in the Disks of Two Spiral Galaxies. *P. C. van der Kruit and K. C. Freeman.* **278**, 81, 24-G11 (1984)
- Two Early-Type Galaxies with Ionized Gas Disks. *Nelson Caldwell.* **278**, 96, 25-A12 (1984)
- Formation of Dissipative Structures in Galaxies. *Toshiya Nozakura and Satoru Ikeuchi.* **279**, 40, 37-D5 (1984)
- The Dynamics of the Narrow Line Regions of Seyfert Galaxies. *Julian H. Krolik and J. M. Vrilek.* **279**, 521, 43-E5 (1984)
- The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. *L. Botinelli, L. Gouguenheim, G. Patureau, and G. de Vaucouleurs.* **280**, 34, 49-C14 (1984)
- Infall in Elliptical Galaxies. *Raymond E. White III and Roger A. Chevalier.* **280**, 561, 56-A6 (1984)

- The Kinematics of Giant Extragalactic H II Region. *Evan D. Skillman and Bruce Balick*. **280**, 580, 56-B11 (1984)
- Stochastic Self-propagating Star Formation in Three-dimensional Disk Galaxy Simulations: Erratum. *Thomas Statler, Neil Comins, and Bruce Smith*. **280**, 937, 60-B1 (1984) (Orig. paper in **270**, 79, 77-G3)
- Scale-free Models of Galaxies. III. A Survey of the Oblate E6 Solution Set. *Douglas O. Richstone*. **281**, 100, 62-A11 (1984)
- AB Stars in the Southern Galactic Halo. III. Kinematics of the Halo. *Jeffrey R. Pier*. **281**, 260, 63-F8 (1984)
- Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. *W. Y. Chau, Kayll Lake, and J. Stone*. **281**, 560, 68-F2 (1984)
- Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). *Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York*. **281**, 585, 69-A5 (1984)
- On the "3 Kiloparsec Arm": Resonance Excitation of Linear and Nonlinear Waves by an Oval Distortion in the Central Region. *C. Yuan*. **281**, 600, 69-B6 (1984)
- Kinematics of Molecular Clouds. I. Velocity Dispersion in the Solar Neighborhood. *Antony A. Stark*. **281**, 624, 69-D2 (1984)
- Spiral Instabilities Provoked by Accretion and Star Formation. *J. A. Sellwood and R. G. Carlberg*. **282**, 61, 74-E12 (1984)
- Spiral Structure and Star Formation. II. Stellar Lifetimes and Cloud Kinematics. *Mark A. Hausman and William W. Roberts, Jr.* **282**, 106, 75-B4 (1984)
- Galactic Detonation Waves: Numerical Models Illustrating the Transition from Deterministic to Stochastic. *Wendy L. Freedman, Barry F. Madore, and Sanju Mehta*. **282**, 412, 79-E5 (1984)
- A Kinematic Method for Measuring the Pattern Speed of Barred Galaxies. *Scott Tremaine and Martin D. Weinberg*. **282**, L5, 78-A6 (1984)
- Seven Poor Clusters of Galaxies. *Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis*. **283**, 33, 86-D3 (1984)
- Kinematics of Galactic Globular Clusters. *A. W. Rodgers and G. Paltoglou*. **283**, L5, 91-E8 (1984)
- Evidence for a Central Mass Concentration in M32. *John L. Tonry*. **283**, L27, 97-A4 (1984)
- Spin Statistics in Binary Galaxies: Implications for Formation and Evolution. *George Helou*. **284**, 471, 104-C9 (1984)
- The Variable Component of the NGC 4151 IUE Spectrum: Evidence for an Expanding Spherical Emission Shell. *Ronald Stoner, Roger Ptak, and Stephen Gregory*. **285**, 69, 110-F9 (1984)
- Face-on Galaxies. *B. M. Lewis*. **285**, 453, 116-D5 (1984)
- Extended Gaseous Emission in Normal Elliptical Galaxies. *M.-H. Demoulin-Ulrich, H. R. Butcher, and A. Boksenberg*. **285**, 527, 117-C4 (1984)
- Milgrom's Revision of Newton's Laws: Dynamical and Cosmological Consequences. *James E. Felten*. **286**, 3, 122-A7 (1984)
- Does the Missing Mass Problem Signal the Breakdown of Newtonian Gravity? *Jacob Bekenstein and Mordehai Milgrom*. **286**, 7, 122-A11 (1984)
- A General Method for Constructing Spherical Galaxy Models. *Douglas O. Richstone and Scott Tremaine*. **286**, 27, 122-C3 (1984)
- Angular Momentum Growth in Protogalaxies. *Simon D. M. White*. **286**, 38, 122-C14 (1984)
- Preferred Orbit Planes in Triaxial Galaxies. II. Tumbling about a Nonprincipal Axis. *Laurence P. David, Richard H. Durisen, and Thomas Y. Steiman-Cameron*. **286**, 53, 122-E1 (1984)
- Gravitational Spurs and Resonances: Effects of Small Mass Disturbances in Spiral Galaxy Disks. *Gene G. Byrd, Bruce F. Smith, and Richard H. Miller*. **286**, 62, 122-E10 (1984)
- Rotation and Surface Brightness in Elliptical Galaxies. *Rosemary F. G. Wyse and Bernard J. T. Jones*. **286**, 88, 122-G8 (1984)
- Studying the Internal Kinematics of Galaxies Using the Calcium Infrared Triplet. *Alan Dressler*. **286**, 97, 123-A3 (1984)
- The Velocity Dispersion in the Disk of the S0 Galaxy NGC 1553. *John Kormendy*. **286**, 116, 123-B11 (1984)
- The Velocity Dispersion in the Disk of the SB0 Galaxy NGC 936. *John Kormendy*. **286**, 132, 123-D1 (1984)
- Dissipative Formation of an Elliptical Galaxy. *R. G. Carlberg*. **286**, 403, 127-D11 (1984)
- Dissipative Models for the Sequence of Elliptical Galaxies. *R. G. Carlberg*. **286**, 416, 127-E12 (1984)
- Stellar and Gas Kinematics in Disk Galaxies. *Bradley C. Whitmore, Vera C. Rubin, and W. Kent Ford, Jr.* **287**, 66, 133-F3 (1984)
- On the Structure of the Nucleus of M31. *Jean-Luc Nieto*. **287**, 108, 134-B6 (1984)
- Spatially Resolved High-Velocity Outflow from the Nucleus of M51. *Gerald Cecil and James A. Rose*. **287**, 131, 134-D2 (1984)
- On Schwarzschild's Method for the Construction of Model Galaxies. *Peter O. Vandervoort*. **287**, 475, 139-D1 (1984)
- Interacting Binary Galaxies. I. A Numerical Model and Preliminary Results. *Kirk D. Borne*. **287**, 503, 139-F2 (1984)
- Galaxies: Jets**
- 4C 2947: Quasi-periodic Outbursts Recorded by Precessing Jets? *J. J. Condon and K. J. Mitchell*. **276**, 472, 6-F8 (1984)
- Bent Jets in High-Redshift Galaxies. *P. M. Allan*. **276**, L31, 10-E4 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley*. **277**, 82, 11-G5 (1984)
- Propagation and Growth of Surface Waves on a Supersonic Fluid Jet. *Philip E. Hardee*. **277**, 106, 12-B3 (1984)
- Optical Properties of the Knots in NGC 7385. *S. M. Simkin, G. V. Bicknell, and A. Bosma*. **277**, 513, 17-F3 (1984)
- A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos*. **277**, L35, 22-E1 (1984)
- Radio Structures of Seyfert Galaxies. V. A Flux-Limited Sample of Markarian Galaxies. *James S. Ulvestad and A. S. Wilson*. **278**, 544, 31-G9 (1984)
- 3C 111: A Luminous Radio Galaxy with a Highly Collimated Jet. *Roger Linfield and Rick Perley*. **279**, 60, 37-E14 (1984)
- Alternating-Side Ejection in Extragalactic Radio Sources. *L. Rudnick and B. K. Edgar*. **279**, 74, 37-G2 (1984)
- Optical Spectrophotometry of the M87 Jet and Its Environs. *William C. Keel*. **279**, 550, 43-G7 (1984)
- Infrared Observations of the 3C 273 Jets. *J. Patrick Henry, E. E. Becklin, and C. M. Telesco*. **280**, 98, 50-B1 (1984)
- Infrared Mapping of the M87 Jet. *N. E. B. Killeen, G. V. Bicknell, A. R. Hyland, and T. J. Jones*. **280**, 126, 50-D3 (1984)
- Luminosity Enhancement in Relativistic Jets and Altered Luminosity Functions for Beamed Objects. *C. M. Urry and R. A. Shafer*. **280**, 569, 55-A14 (1984)
- Hot Spots in Cygnus A at 89 GHz. *Melvyn Wright and Mark Birkinshaw*. **281**, 135, 62-D4 (1984)
- Jet Deflection by Ram Pressure and Pressure Gradients. *Ralph Fiedler and R. N. Henriksen*. **281**, 554, 68-E10 (1984)
- Is 3C 310 Blowing Bubbles? *Wil van Breugel and E. B. Fomalont*. **282**, L55, 85-A11 (1984)
- Radio Jets in Classical Double Radio Sources with Strong Cores. *Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia*. **283**, 515, 92-D12 (1984)
- MHD Kelvin-Helmholtz Instability in Extended Radio Jets. *Ralph Fiedler and T. W. Jones*. **283**, 532, 92-F1 (1984)
- Constraints on Continuous Beam Models of the Jet in 3C 273. *Dana Roberts*. **285**, 64, 110-F4 (1984)
- Radio Structures of Seyfert Galaxies. VI. VLA Observations of a Nearby Sample. *James S. Ulvestad and A. S. Wilson*. **285**, 439, 116-C5 (1984)
- The Jet and Filaments in Cygnus A. *R. A. Perley, J. W. Dreher, and J. J. Cowan*. **285**, L35, 115-A5 (1984)
- A Model for the Surface Brightness of a Turbulent Low Mach Number Jet. I. Theoretical Development and Application to 3C 31. *G. V. Bicknell*. **286**, 68, 122-F2 (1984)
- A Search for Changing Structure in Low-Luminosity Compact Radio Sources. *Dayton L. Jones*. **287**, 33, 133-C12 (1984)
- Helical Twisting on an Adiabatically Expanding Jet. I. Propagation and Temporal Growth. *Philip E. Hardee*. **287**, 523, 139-G10 (1984)
- High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis*. **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)
- Galaxies: Local Group**
- The Distance to IC 1613 from Infrared Photometry of Cepheids. *Christopher W. McAlary, Barry F. Madore, and Lindsey E. Davis*. **276**, 487, 6-G10 (1984)
- Discovery of the First Carbon Star in NGC 6822. *M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman*. **277**, L9, 16-A9 (1984)
- Stellar Populations in Local Group Dwarf Elliptical Galaxies. II. NGC 205. *Jeremy Mould, Jerome Kristian, and G. S. Da Costa*. **278**, 575, 32-B12 (1984)
- Infrared Emission from M31. *H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer*. **276**, L59, 30-A1 (1984)
- The Age(s?) of the Sculptor Dwarf Galaxy. *G. S. Da Costa*. **285**, 483, 116-F7 (1984)
- Photometry of Resolved Galaxies. IV. Holmberg I and Holmberg II. *J. G. Hoessel and G. E. Danielson*. **286**, 159, 123-E9 (1984)
- Galaxies: Magellanic Clouds**
- LMC Blue Globular Clusters Containing Cepheids. I. NGC 1856. *P. W. Hodge and S.-O. Lee*. **276**, 509, 7-B7 (1984)
- A Photometric Comparison of Late-Type Cluster Supergiants in the

Galaxies: Magellanic Clouds—Continued

- Magellanic Clouds and the Galaxy. *P. J. McGregor and A. R. Hyland*. **277**, 149, 12-E7 (1984)
- Ages of Intermediate-Age Magellanic Cloud Star Clusters. *Phillip J. Flower*. **278**, 582, 32-C7 (1984)
- The Population Structure of the Large Magellanic Cloud Bar. *Eduardo Hardy, Roberto Buonanno, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer*. **278**, 592, 32-D3 (1984)
- The Population Structure of the Wing of the Small Magellanic Cloud. *Eduardo Hardy and Daniel Durand*. **279**, 567, 44-A13 (1984)
- International Ultraviolet Explorer Observations of Stars in 30 Doradus: Extinction and Stellar Continuum. *Edward L. Fitzpatrick and Blair D. Savage*. **279**, 578, 44-B10 (1984)
- The Intermediate Age SMC Globular Cluster Lindsay 113. *J. R. Mould, G. S. Da Costa, and M. D. Crawford*. **280**, 595, 56-C12 (1984)
- Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. *R. Brent Tully and S. C. Wolff*. **281**, 67, 61-F3 (1984)
- Nonequilibrium Analysis of Supernova Remnants in the Large Magellanic Cloud. *R. Fusco-Femiano and A. Preite-Martinez*. **281**, 593, 69-A13 (1984)
- Interpretation of the Number versus Diameter Distribution for Supernova Remnants in the Large Magellanic Cloud. *John P. Hughes, David J. Helfand, and Steven M. Kahn*. **281**, L25, 65-F11 (1984)
- Spectrophotometry of Young Supernova Remnants. *Michael A. Dopita and Ian R. Tuohy*. **282**, 135, 75-D7 (1984)
- Ultraviolet Interstellar Absorption toward Stars in the Small Magellanic Cloud. II. Sk 159. *Edward L. Fitzpatrick*. **282**, 436, 80-A1 (1984)
- SMC X-1 Variability Observed from HEAO 1. *D. E. Gruber and R. E. Rothschild*. **283**, 546, 92-G1 (1984)
- The Clusters NGC 419 and NGC 416 in the Wing of the Small Magellanic Cloud. *Daniel Durand, Eduardo Hardy, and Jorge Melnick*. **283**, 552, 92-G7 (1984)
- Does the Ellipticity of Clusters in the LMC Correlate with Age or Luminosity? *Sidney van den Bergh and Christopher L. Morbey*. **283**, 598, 93-D11 (1984)
- The Evolution of Asymptotic Giant Branch Stars in the Large Magellanic Cloud. *Neill Reid and Jeremy Mould*. **284**, 98, 99-A14 (1984)
- Color-Magnitude Diagram Photometry of the LMC Red Cluster NGC 1978. *Edward W. Olszewski*. **284**, 108, 99-B11 (1984)
- The Initial Mass Function for Massive Stars in the Galaxy and the Magellanic Clouds. *Roberta M. Humphreys and Douglas B. McElroy*. **284**, 565, 105-C6 (1984)
- The Luminosity Scale of Cepheid Variable Stars: A Revision. *Edward G. Schmidt*. **285**, 501, 117-A4 (1984)
- IUE Observations of the Clusters of the Magellanic Clouds. *J. G. Cohen, R. M. Rich, and S. E. Persson*. **285**, 595, 118-A12 (1984)
- A Distance to the Large Magellanic Cloud by Main-Sequence Fitting. *Robert A. Schommer, Edward W. Olszewski, and Marc Aaronson*. **285**, L53, 121-D11 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. *A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles*. **286**, 196, 124-B2 (1984)
- Main-Sequence Photometry of the SMC Globular Cluster Kron 3. *R. M. Rich, G. S. Da Costa, and J. R. Mould*. **286**, 517, 128-G1 (1984)
- Discovery of a 50 Millisecond Pulsar in the Large Magellanic Cloud. *F. D. Seward, F. R. Harnden, Jr., and David J. Helfand*. **287**, L19, 138-D5 (1984)
- An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 - 693 in the Large Magellanic Cloud. *Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds*. **287**, L23, 138-D9 (1984)
- The Early-Type Strong Emission-Line Supergiants of the Magellanic Clouds: A Spectroscopic Zoology. *Steven N. Shore and N. Sanduleak*. **55**, 1, 11-A2 (1984) (Abstr. in **279**, 909, 47-F14)
- The Globular Cluster System of the Galaxy. III. Measurements of Radial Velocity and Metallicity for 60 Clusters and a Compilation of Metallicities for 121 Clusters. *Robert Zinn and Michael J. West*. **55**, 45, 11-D4 (1984) (Abstr. in **279**, 910, 47-G1)
- Faint Star Studies in the Magellanic Clouds. II. Field Regions 9° Northeast of the Large Magellanic Cloud Bar. *L. L. Stryker*. **55**, 127, 13-A2 (1984) (Abstr. in **280**, 938, 60-B2)
- Supernova Remnants in the Magellanic Clouds. *D. S. Matthewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle*. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- Galaxies: Milky Way**
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. *Chanda J. Jog and P. M. Solomon*. **276**, 127, 2-C8 (1984)
- The Distribution of Stars Perpendicular to a Galactic Disk. *John N. Bahcall*. **276**, 156, 2-E9 (1984)
- Self-consistent Determinations of the Total Amount of Matter near the Sun. *John N. Bahcall*. **276**, 169, 2-F8 (1984)
- Giant Molecular Clouds in the Galaxy. I. The Axisymmetric Distribution of H₂. *D. B. Sanders, P. M. Solomon, and N. Z. Scoville*. **276**, 182, 2-G7 (1984)
- Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. *R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey*. **276**, 551, 7-E9 (1984)
- Spiral Structure and Star Formation. I. Formation Mechanisms and Mean Free Paths. *William W. Roberts, Jr. and Mark Hausman*. **277**, 744, 20-C2 (1984)
- The Einstein Galactic Plane Survey: Statistical Analysis of the Complete X-Ray Sample. *Paul Hertz and Jonathan E. Grindlay*. **278**, 137, 25-E3 (1984)
- IRAS Images of the Galactic Center. *T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden*. **278**, L57, 29-G4 (1984)
- Evidence for High-Velocity Inflow of Neutral Hydrogen toward the Galaxy. *I. F. Mirabel and R. Morris*. **279**, 86, 38-A2 (1984)
- Optical H II Regions in the Outer Galaxy. *Michel Fich and Leo Blitz*. **279**, 125, 38-C12 (1984)
- The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. *J. B. G. M. Bloemen, L. Blitz, and W. Hermsen*. **279**, 136, 38-D9 (1984)
- A Cosmic-Ray Supported Galactic Corona. *Roger A. Chevalier and Claes Fransson*. **279**, L43, 48-A12 (1984)
- Metal Abundances of Galactic Globular Clusters. *Horace A. Smith*. **281**, 148, 62-E3 (1984)
- AB Stars in the Southern Galactic Halo. III. Kinematics of the Halo. *Jeffrey R. Pier*. **281**, 260, 63-F8 (1984)
- On the "3 Kiloparsec Arm": Resonance Excitation of Linear and Nonlinear Waves by an Oval Distortion in the Central Region. *C. Yuan*. **281**, 600, 69-B6 (1984)
- The Chemical Composition of Globular Clusters: Global Trends. *Catherine A. Pilachowski*. **281**, 614, 69-C6 (1984)
- Nearby Molecular Clouds. I. Ophiuchus-Sagittarius, $b > 10^\circ$. *F. Lebrun and Y.-L. Huang*. **281**, 634, 69-D12 (1984)
- Detection of Binaries with Projected Separations as Large as 0.1 Parsec. *David W. Latham, John Tonry, John N. Bahcall, Raymond M. Soneira, and Paul Schechter*. **281**, L41, 66-G10 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. *Paul Hertz and Jonathan E. Grindlay*. **282**, 118, 75-C2 (1984)
- Observations of the Stellar Radiation Field at 975 Å. *Chet B. Opal and Charles S. Weller*. **282**, 445, 80-A10 (1984)
- Abundances of Distant Classical Cepheid Variables. *Hugh C. Harris and Catherine A. Pilachowski*. **282**, 655, 82-B13 (1984)
- The H I Halo in the Inner Galaxy. *Felix J. Lockman*. **283**, 90, 87-A11 (1984)
- Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^\circ 5'$ to $l = 17^\circ 5'$. *M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall*. **283**, 566, 93-A10 (1984)
- A Search for Distant Halo RR Lyrae Stars. *A. Saha*. **283**, 580, 93-B11 (1984)
- A Far-Infrared Survey of the Galactic Center. *Sten F. Odenwald and Giovanni G. Fazio*. **283**, 601, 93-D14 (1984)
- Kinematics of Galactic Globular Clusters. *A. W. Rodgers and G. Paltoğlu*. **283**, L5, 91-E8 (1984)
- The Distribution of CO in the Galaxy for Longitudes 294° to 86° . *B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon*. **283**, L31, 97-A8 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin*. **284**, 118, 99-D1 (1984)
- Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. *Rida Farouki, Stuart L. Shapiro, and Ira Wasserman*. **284**, 282, 101-B3 (1984)
- The Initial Mass Function for Massive Stars in the Galaxy and the Magellanic Clouds. *Roberta M. Humphreys and Douglas B. McElroy*. **284**, 565, 105-C6 (1984)
- Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^\circ$ to $l = +62^\circ$: Structure and Energetics of the Inner Disk. *M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung*. **285**, 74, 110-F14 (1984)
- The Galaxy as a Self-regulated Star-forming System: The Case of the OB Associations. *José Franco and Steven N. Shore*. **285**, 813, 120-C13

- (1984)
- The Location of Infrared Sources in the Galactic Center from a Deep 1 Micron CCD Image. *J. P. Henry, D. L. DeFoy, and E. E. Becklin.* **285**, L27, 114-G12 (1984)
- Abundance Estimates for the Distant Anticenter Clusters King 8 and Be 19. *C. A. Christian.* **286**, 552, 129-C1 (1984)
- Limits on Soft X-Ray Flux from Distant Emission Regions. *D. N. Burrows, D. McCammon, W. T. Sanders, and W. L. Kraushaar.* **287**, 208, 135-B13 (1984)
- Ultraviolet Radiation from White Dwarfs and the Carbon Ionization in the Galactic Halo. *Nino Panagia and Yervant Terzian.* **287**, 315, 136-D5 (1984)
- SAS 3 Survey of the Soft X-Ray Background. *Frederic J. Marshall and George W. Clark.* **287**, 633, 141-B5 (1984)
- K Giants and the Total Amount of Matter near the Sun. *John N. Bahcall.* **287**, 926, 144-C13 (1984)
- The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. *T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf.* **287**, L15, 138-D1 (1984)
- A Survey of the Latitude Structure of Galactic H I on Small Angular Scales. *T. M. Bania and Felix J. Lockman.* **54**, 513, 8-F9 (1984) (Abstr. in **278**, 895, 35-E13)
- The Globular Cluster System of the Galaxy. III. Measurements of Radial Velocity and Metallicity for 60 Clusters and a Compilation of Metallicities for 121 Clusters. *Robert Zinn and Michael J. West.* **55**, 45, 11-D4 (1984) (Abstr. in **279**, 910, 47-G1)
- Comparisons of a Standard Galaxy Model with Stellar Observations in Five Fields. *John N. Bahcall and Raymond M. Soneira.* **55**, 67, 11-E12 (1984) (Abstr. in **279**, 910, 47-G1)
- Galaxies: Nuclei**
- Optical Characteristics of Young Quasars as Sources of the Cosmic X-Ray Background. *Elihu Boldt and Darryl Leiter.* **276**, 427, 6-C2 (1984)
- Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. *Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer.* **276**, 480, 6-G3 (1984)
- Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. *R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey.* **276**, 551, 7-E9 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis.* **277**, 115, 12-B12 (1984)
- App 91: Interaction and Star Formation in a Galaxy Pair. *C. R. Jenkins.* **277**, 501, 17-E5 (1984)
- A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos.* **277**, L35, 22-E1 (1984)
- Host Galaxies of Quasars and Their Association with Galaxy Clusters. *T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff.* **278**, 11, 24-B2 (1984)
- The 20 Year Spectral Evolution of the Radio Nucleus of NGC 1275. *Christopher P. O'Dea, William A. Dent, and Thomas J. Balonek.* **278**, 89, 25-A5 (1984)
- The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury.* **278**, 112, 25-C4 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga.* **278**, 530, 31-F9 (1984)
- Radio Structures of Seyfert Galaxies. V. A Flux-Limited Sample of Markarian Galaxies. *James S. Ulvestad and A. S. Wilson.* **278**, 544, 31-G9 (1984)
- The Line Continuum Luminosity Ratio in Active Galactic Nuclei: Or, On the "Baldwin Effect". *R. Mushotzky and G. J. Ferland.* **278**, 558, 32-A9 (1984)
- IRAS Images of the Galactic Center. *T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden.* **278**, L57, 29-G4 (1984)
- The Compact Radio Source 2021 + 614: A Peculiar Narrow-Line Radio Galaxy. *Norbert Bartel, Irwin I. Shapiro, John P. Huchra, and Helmut Kühr.* **279**, 112, 38-B13 (1984)
- The Dynamics of the Narrow Line Regions of Seyfert Galaxies. *Julian H. Krolik and J. M. Vrilek.* **279**, 521, 43-E5 (1984)
- The Peculiar Galaxy IC 4553: VLA-A Observations of the OH Megamaser. *Willem A. Baan and Aubrey D. Haschick.* **279**, 541, 43-F12 (1984)
- Optical Spectrophotometry of the M87 Jet and Its Environs. *William C. Keel.* **279**, 550, 43-G7 (1984)
- Observations of NGC 4151 at 2 keV to 2 MeV from *HEAO 1*. *W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini.* **279**, 555, 44-A1 (1984)
- Observations of Infrared Hydrogen Recombination Line Emission from External Galaxies. *S. C. Beck, S. Beckwith, and Ian Gatley.* **279**, 563, 44-A9 (1984)
- Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. *Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and J. W. V. Storey.* **279**, L1, 42-D3 (1984)
- Induced Nuclear Emission-Line Activity in Interacting Spiral Galaxies. *Robert C. Kennicutt, Jr. and William C. Keel.* **279**, L5, 42-D7 (1984)
- Two-Temperature Model of Spherical Accretion onto a Black Hole. *M. Colpi, L. Maraschi, and A. Treves.* **280**, 319, 52-D11 (1984)
- The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. *D. E. Harris, C. H. Costain, and P. E. Dewdney.* **280**, 532, 55-F3 (1984)
- The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. *William K. Rose, John Guillery, James H. Beall, and Selig Kainer.* **280**, 550, 55-G8 (1984)
- The Nature of Multiple-Nucleus Cluster Galaxies. *David Merritt.* **280**, L5, 54-C6 (1984)
- Ultraviolet Observations of Starburst and Mini-Seyfert Galactic Nuclei. *Trinh X. Thuan.* **281**, 126, 62-C9 (1984)
- The Kinematics of the Narrow-Line Region in Active Galaxies and Quasars. III. Correlations with the Broad-Line Region and Radio Emission. *T. M. Heckman, G. K. Miley, and R. F. Green.* **281**, 525, 68-C9 (1984)
- Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the *HEAO 3* Gamma-Ray Spectrometer. *Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson.* **281**, 566, 68-F8 (1984)
- Soft X-Ray Active Galactic Nuclei. *Steven H. Pravdo and Francis E. Marshall.* **281**, 570, 68-G12 (1984)
- Nonadiabatic Self-consistent Spherical Accretion as a Model for Quasars and Active Galactic Nuclei. *A. Wandel, A. Yahil, and M. Milgrom.* **282**, 53, 74-E4 (1984)
- Optical Properties of Spiral Galaxies with Strong Nuclear Radio Sources: Active Nuclei, Starbursts, and Composite Objects. *William C. Keel.* **282**, 75, 74-F13 (1984)
- On the Detection of Positrons via the Optical Lines of Positronium. *Jeffrey E. McClintock.* **282**, 291, 77-A12 (1984)
- X-Ray Observations of M33 with the High Resolution Imager on the *Einstein Observatory*: Erratum. *Thomas H. Markert and Andrew D. Rallis.* **282**, 359, 77-F9 (1984) (Orig. paper in **275**, 571, 143-F14)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. *C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper.* **282**, 427, 79-G4 (1984)
- Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wanner, and D. P. Woody.* **282**, L59, 85-B4 (1984)
- Images and Spectra of the Host Galaxy of the QSO Markarian 1014. *John W. MacKenty and Alan Stockton.* **283**, 64, 86-F9 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis.* **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- Very Low Luminosity Active Galaxies and the X-Ray Background. *Martin Elvis, Andrzej Soltan, and William C. Keel.* **283**, 479, 92-A13 (1984)
- X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. *Tommaso Maccacaro, Isabella M. Gioia, and John T. Stocke.* **283**, 486, 92-B6 (1984)
- The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log *N*-Log *S*. *Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub.* **283**, 495, 92-C1 (1984)
- Radio Jets in Classical Double Radio Sources with Strong Cores. *Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia.* **283**, 515, 92-D12 (1984)
- Spectra from Pair-Equilibrium Plasmas. *Andrzej A. Zdziarski.* **283**, 842, 96-B5 (1984)
- Evidence for a Central Mass Concentration in M32. *John L. Tonry.* **283**, L27, 97-A4 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. *P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda.* **284**, 54, 98-E3 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin.* **284**,

Galaxies: Nuclei—Continued

- 118, 99-D1 (1984)
- Optically Thick, Time-dependent Spherical Accretion onto a Black Hole. I. Equations and Numerical Methods. *Peter Vitello*. **284**, 394, 102-C3 (1984)
- A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. *Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Ruis*. **284**, 519, 104-G1 (1984)
- Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga*. **284**, 523, 104-G5 (1984)
- Radio Continuum Activity in the Elliptical Galaxy NGC 1052. *J. M. Wrobel*. **284**, 531, 104-G13 (1984)
- The Ionization Mechanism for Gas in the Nuclei of NGC 1052 and NGC 4278. *James A. Rose and Michael J. Tripicco*. **285**, 55, 110-E9 (1984)
- The Variable Component of the NGC 4151 IUE Spectrum: Evidence for an Expanding Spherical Emission Shell. *Ronald Stoner, Roger Ptak, and Stephen Gregory*. **285**, 69, 110-F9 (1984)
- Radio Structures of Seyfert Galaxies. VI. VLA Observations of a Nearby Sample. *James S. Ulvestad and A. S. Wilson*. **285**, 439, 116-C5 (1984)
- NGC 7213: A Key to the Nature of Liners? *Alexei V. Filippenko and J. P. Halpern*. **285**, 458, 116-D10 (1984)
- Extended Gaseous Emission in Normal Elliptical Galaxies. *M.-H. Demoulin-Ulrich, H. R. Butcher, and A. Boksenberg*. **285**, 527, 117-C4 (1984)
- Position-dependent Infrared Spectroscopy of M82: 100,000 Orion Nebulae? *B. Jones and J. M. Rodriguez-Espinoza*. **285**, 580, 117-G11 (1984)
- Radiation Pressure and the Stability of Broad-Line Region Clouds. *G. J. Ferland and Moshe Elitzur*. **285**, L11, 114-F11 (1984)
- The Location of Infrared Sources in the Galactic Center from a Deep 1 Micron CCD Image. *J. P. Henry, D. L. DePoy, and E. E. Becklin*. **285**, L27, 114-G12 (1984)
- Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. *G. J. Ferland and R. F. Mushotzky*. **286**, 42, 122-D4 (1984)
- The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 - 65. *R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips*. **286**, 464, 128-B10 (1984)
- The Complex X-Ray Emission of NGC 253. *G. Fabbiano and G. Trinchieri*. **286**, 491, 128-D14 (1984)
- A Search for Changing Structure in Low-Luminosity Compact Radio Sources. *Dayton L. Jones*. **287**, 33, 133-C12 (1984)
- Compact-Core-dominated Radio Emission from Bright E/S0 Galaxies. *J. M. Wrobel and D. S. Heeschen*. **287**, 41, 133-D5 (1984)
- On the Structure of the Nucleus of M31. *Jean-Luc Nieto*. **287**, 108, 134-B6 (1984)
- Photon-Photon Absorption and the Uniqueness of the Spectra of Active Galactic Nuclei. *Demosthenes Kazanas*. **287**, 112, 134-B10 (1984)
- On the Origin of Power-Law X-Ray Spectra of AGNs. *Isaac Schlosman, Jacob Shaham, and Giora Shaviv*. **287**, 534, 140-A7 (1984)
- The Underlying Galaxies of Quasars. II. Imaging of a Radio-loud Sample. *Matthew A. Malkan*. **287**, 555, 140-C1 (1984)
- Recognizing Merger Remnants among Normal Elliptical Galaxies: NGC 5813. *John Kormendy*. **287**, 577, 140-D9 (1984)
- Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. *David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm*. **287**, 586, 140-E5 (1984)
- The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. *T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf*. **287**, L15, 138-D1 (1984)
- Galaxies: Photometry**
- Searching for the Optimal Means of Comparative H I Analysis. *Gregory D. Bothun*. **277**, 532, 17-G9 (1984)
- Images in the Rocket Ultraviolet: Photometry of M101. *Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher*. **277**, 542, 18-A5 (1984)
- Host Galaxies of Quasars and Their Association with Galaxy Clusters. *T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff*. **278**, 11, 24-B2 (1984)
- The Bright End of the Color-Magnitude Relation for Early-Type Galaxies in Clusters. *Phyllis M. Lugger*. **278**, 51, 24-E6 (1984)
- The Distances and Properties of a Sample of Sc I Galaxies. *Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould*. **278**, 475, 31-B9 (1984)
- Stellar Populations in Local Group Dwarf Elliptical Galaxies. II. NGC 205. *Jeremy Mould, Jerome Kristian, and G. S. Da Costa*. **278**, 575, 32-B12 (1984)
- Infrared Galaxies in the IRAS Minisurvey. *B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young*. **278**, L71, 30-C5 (1984)
- Digital Surface Photometry of Galaxies toward a Quantitative Classification. III. A Mean Concentration Index as a Parameter Representing the Luminosity Distribution. *S. Okamura, K. Kodaira, and M. Watanabe*. **280**, 7, 49-A13 (1984)
- The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. *L. Bottinelli, L. Gouguenheim, G. Paturel, and G. de Vaucouleurs*. **280**, 34, 49-C14 (1984)
- The Underlying Galaxies of X-Ray-Selected Quasars. *Matthew A. Malkan, Bruce Margon, and Gary A. Chanan*. **280**, 66, 49-F7 (1984)
- 1-20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward*. **280**, 514, 56-B5 (1984)
- Infrared Photometry and Optical Spectroscopy of Dwarf Galaxies in the Virgo Cluster. *Gregory D. Bothun and C. Nelson Caldwell*. **280**, 528, 55-E13 (1984)
- The Families of Elliptical-like Galaxies. *Allan Wirth and John S. Gallagher III*. **282**, 85, 74-G10 (1984)
- The Effect of the Perturbation of the Local Velocity Field by Virgo on the Calculation of Differential Luminosity Functions. *R. G. Kraan-Korteweg, Allan Sandage, and G. A. Tammann*. **283**, 24, 86-C7 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. *B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson*. **283**, L1, 91-E3 (1984)
- Ongoing Star Formation in NGC 3310: An Infrared Perspective. *C. M. Telesco and Ian Gatley*. **284**, 557, 105-B12 (1984)
- Velocity Dispersions of Disk Stars in Spiral Galaxies. *John N. Bahcall and Stefano Casertano*. **284**, L35, 109-B5 (1984)
- The Evolution of Galaxies in Clusters. V. A Study of Populations since $z \sim 0.5$. *Harvey Butcher and Augustus Oemler, Jr.*. **285**, 426, 116-B6 (1984)
- Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. *Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen*. **285**, 515, 117-B6 (1984)
- Rotation and Surface Brightness in Elliptical Galaxies. *Rosemary F. G. Wyse and Bernard J. T. Jones*. **286**, 88, 122-G8 (1984)
- The Structure of First-Ranked Cluster Galaxies and the Radius-Magnitude Relation. *Phyllis M. Lugger*. **286**, 106, 123-A14 (1984)
- The Velocity Dispersion in the Disk of the S0 Galaxy NGC 1553. *John Kormendy*. **286**, 116, 123-B11 (1984)
- Photometry of Resolved Galaxies. IV. Holmberg I and Holmberg II. *J. G. Hoessel and G. E. Danielson*. **286**, 159, 123-E9 (1984)
- CCD Observations of Galaxies in Clusters at High Redshift. *R. Schild*. **286**, 450, 128-A6 (1984)
- The Underlying Galaxies of Quasars. II. Imaging of a Radio-loud Sample. *Matthew A. Malkan*. **287**, 555, 140-C1 (1984)
- Recognizing Merger Remnants among Normal Elliptical Galaxies: NGC 5813. *John Kormendy*. **287**, 577, 140-D9 (1984)
- Reddening Estimates for Galaxies in the Second Reference Catalog and the Uppsala General Catalog. *David Burstein and Carl Heiles*. **54**, 33, 1-C4 (1984) (Abstr. in **275**, 927, 147-E14)
- Blue and Near-Infrared Surface Photometry of Spiral Structure in 34 Nonbarred Grand Design and Flocculent Galaxies. *Debra Meloy Elmegreen and Bruce G. Elmegreen*. **54**, 127, 2-E13 (1984) (Abstr. in **275**, 929, 147-F2)
- An Atlas of QSO Luminosity Profiles. *J. B. Hutchings, D. Crampton, B. Campbell, D. Duncan, and B. Glendenning*. **55**, 319, 15-C4 (1984) (Abstr. in **280**, 940, 60-B4)
- CCD Surface Photometry of Field Galaxies. I. Observations. *Stephen M. Kent*. **56**, 105, 23-B5 (1984) (Abstr. in **283**, 907, 96-F14)
- Distant Clusters of Galaxies. I. Uniform Photometry of Rich Clusters. *Warrick J. Couch and E. B. Newell*. **56**, 143, 23-E1 (1984) (Abstr. in **283**, 907, 96-F14)
- A Surface Photometry of Edge-on Galaxies. V. The Vertical Structure of the Bar in NGC 4762. *Ken-ichi Wakamatsu and Masaru Hamabe*. **56**, 283, 26-B3 (1984) (Abstr. in **284**, 907, 108-E2)
- Galaxies: Redshifts**
- A Large Quasar Inhomogeneity on the Sky. *Halton Arp*. **277**, L27, 22-D8 (1984)
- Constraints on the Anisotropy of the Velocity Dispersion of the Coma Cluster. *Carlton Pryor and Margaret J. Geller*. **278**, 457, 31-A5 (1984)
- The Distances and Properties of a Sample of Sc I Galaxies. *Gregory D. Bothun, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould*. **278**, 475, 31-B9 (1984)
- Constraints on the Orbits of Multiple Nuclei in Brightest Cluster

- Galaxies. *John L. Tonry*. **279**, 13, 37-B5 (1984)
- The X-Ray Luminosity Function of Abell Clusters at a Redshift of 0.25. *J. Patrick Henry and Russell J. Lavery*. **280**, 1, 49-A6 (1984)
- An Imaging Survey of Fields around Quasars. II. The Association of Galaxies with Quasars. *H. K. C. Yee and Richard F. Green*. **280**, 79, 49-G10 (1984)
- Supercluster-Supercluster Interactions. *Edward J. Shaya*. **280**, 470, 55-A10 (1984)
- Splitting of C IV Lines in a QSO Absorption-Line System. *D. G. York, Richard F. Green, Jill Bechtold, and Frederic H. Chaffee, Jr.* **280**, L1, 54-C2 (1984)
- 3C 324—An Extremely Distant Cluster Radio Galaxy. *Hyron Spinrad and S. Djorgovski*. **280**, L9, 54-C11 (1984)
- Internal Kinematics of Galaxies in Clusters. I. Velocity Dispersions for Elliptical Galaxies in Coma and Virgo. *Alan Dressler*. **281**, 512, 68-B10 (1984)
- Velocity Distribution of Virgo Cluster Galaxies. *Christ Fiacas, Michael N. Fanelli, and Mitchell F. Struble*. **282**, 19, 74-B10 (1984)
- Angular Correlations of Galaxies to $B = 24$: Another Probe of Cosmology and Galaxy Evolution. *David C. Koo and Alexander S. Szalay*. **282**, 390, 79-C7 (1984)
- The Effect of the Perturbation of the Local Velocity Field by Virgo on the Calculation of Differential Luminosity Functions. *R. G. Kraan-Korteweg, Allan Sandage, and G. A. Tammann*. **283**, 24, 86-C7 (1984)
- Seven Poor Clusters of Galaxies. *Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis*. **283**, 33, 86-D3 (1984)
- Cosmological Evolution of Radio Sources Found at 1.4 GHz. *J. J. Condon*. **284**, 44, 98-D7 (1984)
- The A2197 and A2199 Galaxy Clusters. *Stephen A. Gregory and Laird A. Thompson*. **286**, 422, 127-F4 (1984)
- Double Galaxy Redshifts and Dynamical Analyses. *N. A. Sharp*. **286**, 437, 127-G5 (1984)
- Redshift Differentials in a Complete Sample of Galaxy Groups. *Jack W. Sulentic*. **286**, 442, 127-G12 (1984)
- The Dependence on Distance and Redshift of the Velocity Vectors of the Sun, the Galaxy, and the Local Group with Respect to Different Extragalactic Frames of Reference. *G. de Vaucouleurs and W. L. Peters*. **287**, 1, 133-A6 (1984)
- Cosmological Evolution of Radio Sources. *J. J. Condon*. **287**, 461, 139-C1 (1984)
- How to Find Galaxies at High Redshift. *Lee W. Hartmann, John P. Huchra, and Margaret J. Geller*. **287**, 487, 139-D13 (1984)
- Global Redshift Quantization. *W. G. Tift and W. J. Cocke*. **287**, 492, 139-E4 (1984)
- Groups of Galaxies. III. The CfA Survey: Erratum. *M. J. Geller and J. P. Huchra*. **54**, 442, 7-F13 (1984) (Orig. paper in **52**, 61, 10-A2)
- An Imaging Survey of Fields around Quasars. I. A Catalog. *Richard F. Green and H. K. C. Yee*. **54**, 495, 8-E5 (1984) (Abstr. in **278**, 895, 35-E13)
- H I Observations in the Virgo Cluster Area. II. A Complete, Magnitude-Limited Sample of Spiral Galaxies. *George Helou, G. Lyle Hoffman, and E. E. Salpeter*. **55**, 433, 17-A1 (1984) (Abstr. in **281**, 890, 72-C3)
- Wide-Angle Radio Tail QSOs as Members of Clusters of Galaxies. II. Direct Optical Observations and Spectroscopy of QSO Fields. *Paul Hintzen*. **55**, 533, 18-A1 (1984) (Abstr. in **281**, 891, 72-C4)
- Galaxies: Seyfert**
- Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. *D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu*. **276**, 92, 2-A1 (1984)
- Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. *E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin*. **276**, 403, 6-A5 (1984)
- Variability of the Ultraviolet Spectrum of BL Lacertae Objects. *M. H. Ulrich, K. R. H. Hackney, R. L. Hackney, and Y. Kondo*. **276**, 466, 6-F2 (1984)
- Neutral Hydrogen in Seyfert Galaxies. *I. F. Mirabel and A. S. Wilson*. **277**, 92, 12-A3 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **277**, 115, 12-B12 (1984)
- Observational Tests of X-Ray Heating in the Broad-Line Region of Quasars and Seyfert Galaxies. *Gerard A. Kriss*. **277**, 495, 17-D13 (1984)
- The 20 Year Spectral Evolution of the Radio Nucleus of NGC 1275. *Christopher P. O'Dea, William A. Dent, and Thomas J. Balonek*. **278**, 89, 25-A5 (1984)
- Optical Spectropolarimetry of Radio Galaxies. *Robert R. J. Antonucci*. **278**, 499, 31-D6 (1984)
- Radio Structures of Seyfert Galaxies. V. A Flux-Limited Sample of Markarian Galaxies. *James S. Ulvestad and A. S. Wilson*. **278**, 544, 31-G9 (1984)
- The Line Continuum Luminosity Ratio in Active Galactic Nuclei: Or, On the "Baldwin Effect". *R. Mushotzky and G. J. Ferland*. **278**, 558, 32-A9 (1984)
- The Optical Polarization Properties of "Normal" Quasars. *H. S. Stockman, Richard L. Moore, and J. R. P. Angel*. **279**, 485, 43-B11 (1984)
- The Dynamics of the Narrow Line Regions of Seyfert Galaxies. *Julian H. Krolik and J. M. Vrilek*. **279**, 521, 43-E5 (1984)
- Variability of the Emission-Line Spectra and Optical Continua of Seyfert Galaxies. II. *Bradley M. Peterson, Craig B. Foltz, D. Michael Crenshaw, Karie A. Meyers, and Paul L. Byard*. **279**, 529, 43-E13 (1984)
- Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. *W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Priniti*. **279**, 555, 44-A1 (1984)
- Induced Nuclear Emission-Line Activity in Interacting Spiral Galaxies. *Robert C. Kennicutt, Jr. and William C. Keel*. **279**, L5, 42-D7 (1984)
- Emission-Line Profiles in Low-Redshift QSOs. *James M. Shuder*. **280**, 491, 55-C3 (1984)
- Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. *R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt*. **280**, 499, 55-C11 (1984)
- C IV $\lambda 1550$ Emission Profiles in IUE Spectra of Seyfert 1 Galaxies. *Ronald Stoner and Roger Ptak*. **280**, 516, 55-D14 (1984)
- The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. *Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner*. **280**, 521, 55-E6 (1984)
- The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. *William K. Rose, John Guillory, James H. Beall, and Selig Kainer*. **280**, 550, 55-G8 (1984)
- The Luminosity Function of Seyfert Galaxies and the Cluster 3C 295. *Donald E. Osterbrock*. **280**, L43, 60-D7 (1984)
- Ultraviolet Observations of Starburst and Mini-Seyfert Galactic Nuclei. *Trinh X. Thuan*. **281**, 126, 62-C9 (1984)
- The Unusual 8–13 Micron Spectrum of Markarian 231. *J. D. Bregman and F. C. Witteborn*. **281**, L17, 65-F3 (1984)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. *C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper*. **282**, 427, 79-G4 (1984)
- Photoionization Models and Diagnosis of Physical Properties of the Broad-Line Emission Gas in Quasars and Seyfert Nuclei. *John Kwan*. **283**, 70, 86-G5 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. *Tommaso Maccacaro, Isabella M. Gioia, and John T. Stocke*. **283**, 486, 92-B6 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. *B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson*. **283**, L1, 91-E3 (1984)
- He I $\lambda 10830$ Emission in Seyfert Galaxies and QSOs. *P. D. LeVan, R. C. Puetter, Harding E. Smith, and Richard J. Rudy*. **284**, 23, 98-B14 (1984)
- Effects of Dust on the Infrared Emission, Selected Line Ratios, and Polarization of Seyfert 1 Galaxies, Broad-Line Radio Galaxies, and Quasars. *Richard J. Rudy*. **284**, 33, 98-C10 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. *P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda*. **284**, 54, 98-E3 (1984)
- The Variable Component of the NGC 4151 IUE Spectrum: Evidence for an Expanding Spherical Emission Shell. *Ronald Stoner, Roger Ptak, and Stephen Gregory*. **285**, 69, 110-F9 (1984)
- Radio Structures of Seyfert Galaxies. VI. VLA Observations of a Nearby Sample. *James S. Ulvestad and A. S. Wilson*. **285**, 439, 116-C5 (1984)
- NGC 7213: A Key to the Nature of Liners? *Alexei V. Filippenko and J. P. Halpern*. **285**, 458, 116-D10 (1984)
- The Nonstellar Continuum of the Seyfert Galaxy NGC 7213. *J. P. Halpern and Alexei V. Filippenko*. **285**, 475, 116-E13 (1984)
- An Analysis of the Narrow-Line Profiles in High Ionization Seyfert Galaxies. *M. M. De Robertis and D. E. Osterbrock*. **286**, 171, 123-G5 (1984)
- The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 – 65. *R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips*. **286**, 464, 128-B10 (1984)
- On the Origin of Power-Law X-Ray Spectra of AGNs. *Isaac Schlosman, Jacob Shaham, and Giora Shaviv*. **287**, 534, 140-A7 (1984)

Galaxies Seyfert-Continued

- The Underlying Galaxies of Quasars. II. Imaging of a Radio-loud Sample. *Matthew A. Malkan*. **287**, 555, 140-C1 (1984)
- The Luminous Host Galaxy and Anomalous Brackett-Gamma Line of Markarian 231. *Roc M. Cutri, G. H. Rieke, and M. J. Lebofsky*. **287**, 566, 140-C12 (1984)
- The Case Low-Dispersion Northern Sky Survey. II. *N. Sanduleak and Peter Pesch*. **55**, 517, 17-F13 (1984) (Abstr. in **281**, 892, 72-C5)
- Galaxies: Stellar Content**
- Self-consistent Determinations of the Total Amount of Matter near the Sun. *John N. Bahcall*. **276**, 169, 2-F8 (1984)
- The NGC 5128 Globular Cluster System. *James E. Hesser, Hugh C. Harris, Sidney van den Bergh, and Gretchen L. H. Harris*. **276**, 491, 7-A1 (1984)
- Constraints on the Masses of Supernova Progenitors. *Robert C. Kennicutt, Jr.* **277**, 361, 14-G4 (1984)
- Arp 91: Interaction and Star Formation in a Galaxy Pair. *C. R. Jenkins*. **277**, 501, 17-E5 (1984)
- Images in the Rocket Ultraviolet: Photometry of M101. *Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher*. **277**, 542, 18-A5 (1984)
- The Stellar Content and Metallicity of the NGC 5128 Globular Cluster. *Jay A. Frogel*. **278**, 119, 25-C11 (1984)
- The Mass Profile and Gas Content of M87. *G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen*. **278**, 536, 31-G1 (1984)
- Massive Star Formation in NGC 6946. *K. DeGioia-Eastwood, G. L. Grasdale, S. E. Strom, and K. M. Strom*. **278**, 564, 32-B1 (1984)
- Stellar Populations in Local Group Dwarf Elliptical Galaxies. II. NGC 205. *Jeremy Mould, Jerome Kristian, and G. S. Da Costa*. **278**, 575, 32-B12 (1984)
- Ages of Intermediate-Age Magellanic Cloud Star Clusters. *Phillip J. Flower*. **278**, 582, 32-C7 (1984)
- The Population Structure of the Wing of the Small Magellanic Cloud. *Eduardo Hardy and Daniel Durand*. **279**, 567, 44-A13 (1984)
- The Chemical Composition of Globular Clusters: Global Trends. *Catherine A. Pilachowski*. **281**, 614, 69-C6 (1984)
- Luminosity-dependent Line Ratios in Disks of Spiral Galaxies. *Vera C. Rubin, W. Kent Ford, Jr., and Bradley C. Whitmore*. **281**, L21, 65-F6 (1984)
- Optical Properties of Spiral Galaxies with Strong Nuclear Radio Sources: Active Nuclei, Starbursts, and Composite Objects. *William C. Keel*. **282**, 75, 74-F13 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. *Paul Hertz and Jonathan E. Grindlay*. **282**, 118, 75-C2 (1984)
- On the Correlation of CO Line and Radio Continuum Emission in Nearby Galaxies and the Efficiency of OB Star Formation. *F. P. Israel and M. Rowan-Robinson*. **283**, 81, 87-A2 (1984)
- The Infrared Ca II Triplet: A Luminosity Indicator for Stellar Population Synthesis. *Janet E. Jones, Danielle M. Alloin, and Bernard J. T. Jones*. **283**, 457, 91-A11 (1984)
- The Clusters NGC 419 and NGC 416 in the Wing of the Small Magellanic Cloud. *Daniel Durand, Eduardo Hardy, and Jorge Melnick*. **283**, 552, 92-G7 (1984)
- A Search for Distant Halo RR Lyrae Stars. *A. Saha*. **283**, 580, 93-B11 (1984)
- A Far-Infrared Survey of the Galactic Center. *Sten F. Odenwald and Giovanni G. Fazio*. **283**, 601, 93-D14 (1984)
- Bursts of Star Formation in Computer Simulations of Dwarf Galaxies. *Neil F. Comins*. **284**, 90, 99-A3 (1984)
- The Evolution of Asymptotic Giant Branch Stars in the Large Magellanic Cloud. *Neill Reid and Jeremy Mould*. **284**, 98, 99-A14 (1984)
- Star Formation Histories of Irregular Galaxies. *John S. Gallagher III, Deidre A. Hunter, and Alexander V. Tutukov*. **284**, 544, 105-A12 (1984)
- The Age(s?) of the Sculptor Dwarf Galaxy. *G. S. Da Costa*. **285**, 483, 116-F7 (1984)
- The Galaxy as a Self-regulated Star-forming System: The Case of the OB Associations. *José Franco and Steven N. Shore*. **285**, 813, 120-C13 (1984)
- Photometry of Resolved Galaxies. IV. Holmberg I and Holmberg II. *J. G. Hoessel and G. E. Danielson*. **286**, 159, 123-E9 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. *A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles*. **286**, 196, 124-B2 (1984)
- Infrared Photometry of Globular Clusters in M31. *Michael L. Sitko*. **286**, 209, 124-C1 (1984)
- Abundance Estimates for the Distant Anticenter Clusters King 8 and Be 19. *C. A. Christian*. **286**, 552, 129-C1 (1984)
- Luminous Late-Type Stars in NGC 205. *Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett*. **287**, 138, 134-D9 (1984)
- How to Find Galaxies at High Redshift. *Lee W. Hartmann, John P. Huchra, and Margaret J. Geller*. **287**, 487, 139-D13 (1984)

Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. *David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm*. **287**, 586, 140-E5 (1984)

K Giants and the Total Amount of Matter near the Sun. *John N. Bahcall*. **287**, 926, 144-C13 (1984)

Comparisons of a Standard Galaxy Model with Stellar Observations in Five Fields. *John N. Bahcall and Raymond M. Soneira*. **55**, 67, 11-E12 (1984) (Abstr. in **279**, 910, 47-G1)

Faint Star Studies in the Magellanic Clouds. II. Field Regions 9° Northeast of the Large Magellanic Cloud Bar. *L. L. Stryker*. **55**, 127, 13-A2 (1984) (Abstr. in **280**, 938, 60-B2)

Galaxies: Structure

- Relaxation and Tidal Stripping in Rich Clusters of Galaxies. II. Evolution of the Luminosity Distribution. *David Merritt*. **276**, 26, 1-C3 (1984)
- Continuum Models for Gas in Disturbed Galaxies. I. Model Equations. *John M. Scalo and Curtis Struck-Marcell*. **276**, 60, 1-E9 (1984)
- Preferred Orbit Planes in Triaxial Galaxies. I. Tumbling about a Principal Axis. *Thomas Y. Steiman-Cameron and Richard H. Durisen*. **276**, 101, 2-A10 (1984)
- Two-Fluid Gravitational Instabilities in a Galactic Disk. *Chanda J. Jog and P. M. Solomon*. **276**, 114, 2-B9 (1984)
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. *Chanda J. Jog and P. M. Solomon*. **276**, 127, 2-C8 (1984)
- The Self-consistent Response of Stellar Disks to Bar Forcing. *K. O. Thielheim and H. Wolff*. **276**, 135, 2-D2 (1984)
- Self-consistent Determinations of the Total Amount of Matter near the Sun. *John N. Bahcall*. **276**, 169, 2-F8 (1984)
- Giant Molecular Clouds in the Galaxy. I. The Axisymmetric Distribution of H₂. *D. B. Sanders, P. M. Solomon, and N. Z. Scoville*. **276**, 182, 2-G7 (1984)
- The Evolution of Clusters of Galaxies. II. Tidal Stripping versus Mergers as a Function of Richness. *Eliot M. Mahumuth and Douglas O. Richstone*. **276**, 413, 6-B2 (1984)
- 4C 29.47: Quasi-periodic Outbursts Recorded by Precessing Jets? *J. J. Condon and K. J. Mitchell*. **276**, 472, 6-F8 (1984)
- Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. *Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer*. **276**, 480, 6-G3 (1984)
- On the Photoproduction of Triply Ionized Carbon and Silicon in the Galactic Halo. *T. W. Hartquist, M. Pettini, and A. Tallant*. **276**, 519, 7-C4 (1984)
- Neutral Hydrogen in Seyfert Galaxies. *I. F. Mirabel and A. S. Wilson*. **277**, 92, 12-A3 (1984)
- Spectrophotometry and Image Analysis of the Nebulosity around the Low-Redshift Quasar 0241 + 622. *W. Romanishin, Holland Ford, Robin Ciardullo, and Bruce Margon*. **277**, 487, 17-D5 (1984)
- Optical Properties of the Knots in NGC 7385. *S. M. Simkin, G. V. Bicknell, and A. Bosma*. **277**, 513, 17-F3 (1984)
- NGC 4650A: The Rotation of the Diffuse Stellar Component. *Paul L. Schechter, Marie-Helene Ulrich, and A. Boksenberg*. **277**, 526, 17-G3 (1984)
- Searching for the Optimal Means of Comparative H I Analysis. *Gregory D. Bothun*. **277**, 532, 17-G9 (1984)
- The Propagation and Stability of Time-dependent Galactodetonation Waves. *Steven A. Balbus*. **277**, 550, 18-A14 (1984)
- Spiral Structure and Star Formation. I. Formation Mechanisms and Mean Free Paths. *William W. Roberts, Jr. and Mark Hausman*. **277**, 744, 20-C2 (1984)
- Host Galaxies of Quasars and Their Association with Galaxy Clusters. *T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff*. **278**, 11, 24-B2 (1984)
- What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen*. **278**, 37, 24-D6 (1984)
- An Objective Classification System for Spiral Galaxies. I. The Two Dominant Dimensions. *Bradley C. Whitmore*. **278**, 61, 24-F3 (1984)
- The Vertical Velocity Dispersion of the Stars in the Disks of Two Spiral Galaxies. *P. C. van der Kruit and K. C. Freeman*. **278**, 81, 24-G11 (1984)
- Two Early-Type Galaxies with Ionized Gas Disks. *Nelson Caldwell*. **278**, 96, 25-A12 (1984)
- The Einstein Galactic Plane Survey: Statistical Analysis of the Complete X-Ray Sample. *Paul Hertz and Jonathan E. Grindlay*. **278**, 137, 25-E3 (1984)
- On Galaxy Interactions during Violent Relaxation of Clusters. *A. J. Allen and S. Yabushita*. **278**, 468, 31-B2 (1984)
- The Mass Profile and Gas Content of M87. *G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen*. **278**, 536, 31-G1 (1984)
- Radio Structures of Seyfert Galaxies. V. A Flux-Limited Sample of Markarian Galaxies. *James S. Ulvestad and A. S. Wilson*. **278**, 544,

- 31-G9 (1984)
- The Population Structure of the Large Magellanic Cloud Bar. *Eduardo Hardy, Roberto Buonomano, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer*. **278**, 592, 32-D3 (1984)
- Formation of Dissipative Structures in Galaxies. *Toshiya Nozakura and Satoru Ikeuchi*. **279**, 40, 37-D5 (1984)
- Evidence for High-Velocity Inflow of Neutral Hydrogen toward the Galaxy. *I. F. Mirabel and R. Morris*. **279**, 86, 38-A2 (1984)
- The Molecular Halo of M82. *Antony A. Stark and Eric R. Carlson*. **279**, 122, 38-C9 (1984)
- Optical H II Regions in the Outer Galaxy. *Michel Fich and Leo Blitz*. **279**, 125, 38-C12 (1984)
- The Peculiar Galaxy IC 4553: VLA-A Observations of the OH Megamaser. *Willem A. Baan and Aubrey D. Haschick*. **279**, 541, 43-F12 (1984)
- On the Formation and Dynamics of Shells around Elliptical Galaxies. *P. J. Quinn*. **279**, 596, 44-C14 (1984)
- Hydraulic Jumps in "Viscous" Accretion Disks. *F. Curtis Michel*. **279**, 807, 46-E11 (1984)
- Mass-to-Light Ratios for Binary Pairs of Dwarf Irregular Galaxies. *George Lake and R. A. Schommer*. **279**, L19, 42-E5 (1984)
- Digital Surface Photometry of Galaxies toward a Quantitative Classification. III. A Mean Concentration Index as a Parameter Representing the Luminosity Distribution. *S. Okamura, K. Kodaira, and M. Watanabe*. **280**, 7, 49-A13 (1984)
- The Underlying Galaxies of X-Ray-Selected Quasars. *Matthew A. Malkan, Bruce Margon, and Gary A. Chanan*. **280**, 66, 49-F7 (1984)
- Galactic Warps and the Shape of Heavy Halos. *Linda S. Sparke*. **280**, 117, 50-C8 (1984)
- The Radio Properties of the Broad Absorption-Line Quasars. *J. T. Stocke, C. B. Foltz, R. J. Weymann, and W. A. Christiansen*. **280**, 476, 55-B2 (1984)
- The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. *D. E. Harris, C. H. Costain, and P. E. Dewdney*. **280**, 532, 55-F3 (1984)
- On the Nonuniqueness of Self-propagating Spiral Galaxy Models. *Wendy L. Freedman and Barry F. Madore*. **280**, 592, 56-C9 (1984)
- Stochastic Self-propagating Star Formation in Three-dimensional Disk Galaxy Simulations: Erratum. *Thomas Statler, Neil Comins, and Bruce Smith*. **280**, 937, 60-B1 (1984) (Orig. paper in **270**, 79, 77-G3)
- The Angular Momentum Content of Galaxies. *Edward J. Shaya and R. Brent Tully*. **281**, 56, 61-E6 (1984)
- The Morphology-Density Relation: The Group Connection. *M. Postman and M. J. Geller*. **281**, 95, 62-A6 (1984)
- Scale-free Models of Galaxies. III. A Survey of the Oblate E6 Solution Set. *Douglas O. Richstone*. **281**, 100, 62-A11 (1984)
- Hot Spots in Cygnus A at 89 GHz. *Melvyn Wright and Mark Birkinshaw*. **281**, 135, 62-D4 (1984)
- Spectroscopy of the Nebulosity around Eight High-Luminosity QSOs. *Todd A. Boroson and J. B. Oke*. **281**, 535, 68-D5 (1984)
- Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. *W. Y. Chau, Kayll Lake, and J. Stone*. **281**, 560, 68-F2 (1984)
- On the "3 Kiloparsec Arm": Resonance Excitation of Linear and Nonlinear Waves by an Oval Distortion in the Central Region. *C. Yuan*. **281**, 600, 69-B6 (1984)
- Nearby Molecular Clouds. I. Ophiuchus-Sagittarius, $b > 10^\circ$. *F. Lebrun and Y.-L. Huang*. **281**, 634, 69-D12 (1984)
- Galaxy Mass Distribution from Gravitational Light Deflection. *J. Anthony Tyson, Francisco Valdes, John F. Jarvis, and Allen P. Mills, Jr.*. **281**, L59, 73-A8 (1984)
- Spiral Instabilities Provoked by Accretion and Star Formation. *J. A. Sellwood and R. G. Carlberg*. **282**, 61, 74-E12 (1984)
- The Families of Elliptical-like Galaxies. *Allan Wirth and John S. Gallagher III*. **282**, 85, 74-G10 (1984)
- A Galactic Disk is Not a True Exponential. *Philip E. Seiden, Lawrence S. Schulman, and Bruce G. Elmegreen*. **282**, 95, 75-A7 (1984)
- Spiral Structure and Star Formation. II. Stellar Lifetimes and Cloud Kinematics. *Mark A. Hausman and William W. Roberts, Jr.*. **282**, 106, 75-B4 (1984)
- Direct Determination of Extragalactic Distances from the 21 Centimeter Line Width and the Method of "Sosies". *G. Paturol*. **282**, 382, 79-B12 (1984)
- Galactic Detonation Waves: Numerical Models Illustrating the Transition from Deterministic to Stochastic. *Wendy L. Freedman, Barry F. Madore, and Sanju Mehta*. **282**, 412, 79-E5 (1984)
- A Kinematic Method for Measuring the Pattern Speed of Barred Galaxies. *Scott Tremaine and Martin D. Weinberg*. **282**, L5, 78-A6 (1984)
- Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **282**, L59, 85-B4 (1984)
- The H I Halo in the Inner Galaxy. *Felix J. Lockman*. **283**, 90, 87-A11 (1984)
- A Search for Distant Halo RR Lyrae Stars. *A. Saha*. **283**, 580, 93-B11 (1984)
- Evidence for a Central Mass Concentration in M32. *John L. Tonry*. **283**, L27, 97-A4 (1984)
- The Distribution of CO in the Galaxy for Longitudes 294° to 86° . *B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon*. **283**, L31, 97-A8 (1984)
- X-Ray Observations of Spiral Galaxies. I. Integrated Properties. *G. Fabbiano, G. Trinchieri, and A. Macdonald*. **284**, 65, 98-E14 (1984)
- Violent Relaxation and Dissipationless Collapse. *Jens Verner Villumsen*. **284**, 75, 98-F11 (1984)
- Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. *Rida Farouki, Stuart L. Shapiro, and Ira Wasserman*. **284**, 282, 101-B3 (1984)
- Radio Continuum Activity in the Elliptical Galaxy NGC 1052. *J. M. Wrobel*. **284**, 531, 104-G13 (1984)
- Velocity Dispersions of Disk Stars in Spiral Galaxies. *John N. Bahcall and Stefano Casertano*. **284**, L35, 109-B5 (1984)
- Can the Ballistic Particle Model Explain the Hubble Sequence? *David Leisawitz and Frank Bash*. **285**, 25, 110-C2 (1984)
- Extended Gaseous Emission in Normal Elliptical Galaxies. *M.-H. Demoulin-Ulrich, H. R. Butcher, and A. Boksenberg*. **285**, 527, 117-C4 (1984)
- A General Method for Constructing Spherical Galaxy Models. *Douglas O. Richstone and Scott Tremaine*. **286**, 27, 122-C3 (1984)
- Preferred Orbit Planes in Triaxial Galaxies. II. Tumbling about a Nonprincipal Axis. *Lawrence P. David, Richard H. Durisen, and Thomas Y. Steiman-Cameron*. **286**, 53, 122-E1 (1984)
- Gravitational Spurs and Resonances: Effects of Small Mass Disturbances in Spiral Galaxy Disks. *Gene G. Byrd, Bruce F. Smith, and Richard H. Miller*. **286**, 62, 122-E10 (1984)
- The Structure of First-Ranked Cluster Galaxies and the Radius-Magnitude Relation. *Phyllis M. Lugger*. **286**, 106, 123-A14 (1984)
- The Velocity Dispersion in the Disk of the S0 Galaxy NGC 1553. *John Kormendy*. **286**, 116, 123-B11 (1984)
- The Velocity Dispersion in the Disk of the SB0 Galaxy NGC 936. *John Kormendy*. **286**, 132, 123-D1 (1984)
- Dissipative Formation of an Elliptical Galaxy. *R. G. Carlberg*. **286**, 403, 127-D11 (1984)
- Dissipative Models for the Sequence of Elliptical Galaxies. *R. G. Carlberg*. **286**, 416, 127-E12 (1984)
- CCD Observations of Galaxies in Clusters at High Redshift. *R. Schild*. **286**, 450, 128-A6 (1984)
- High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. *S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley*. **286**, 471, 128-C3 (1984)
- The Complex X-Ray Emission of NGC 253. *G. Fabbiano and G. Trinchieri*. **286**, 491, 128-D14 (1984)
- Stochastic Models for the Evolution of Open Stellar Systems. *Federico Ferrini and Fabio Marchesoni*. **287**, 17, 133-B10 (1984)
- A Search for Changing Structure in Low-Luminosity Compact Radio Sources. *Dayton L. Jones*. **287**, 33, 133-C12 (1984)
- Compact-Core-dominated Radio Emission from Bright E/S0 Galaxies. *J. M. Wrobel and D. S. Heeschen*. **287**, 41, 133-D5 (1984)
- Stellar and Gas Kinematics in Disk Galaxies. *Bradley C. Whitmore, Vera C. Rubin, and W. Kent Ford, Jr.*. **287**, 66, 133-F3 (1984)
- Infrared Observations of Interacting/Merging Galaxies. *Carol J. Lonsdale, S. E. Persson, and K. Matthews*. **287**, 95, 134-A7 (1984)
- Structural Properties of Giant H II Regions in Nearby Galaxies. *Robert C. Kennicutt, Jr.*. **287**, 116, 134-B14 (1984)
- On the Existence of a Dark Halo around the High-Velocity Compact Object near NGC 1199. *Merle F. Walker and Johannes Andersen*. **287**, 148, 134-E5 (1984)
- Ultraviolet Radiation from White Dwarfs and the Carbon Ionization in the Galactic Halo. *Nino Panagia and Yervant Terzian*. **287**, 315, 136-D5 (1984)
- On Schwarzschild's Method for the Construction of Model Galaxies. *Peter O. Vandervoort*. **287**, 475, 139-D1 (1984)
- Interacting Binary Galaxies. I. A Numerical Model and Preliminary Results. *Kirk D. Borne*. **287**, 503, 139-F2 (1984)
- The Underlying Galaxies of Quasars. II. Imaging of a Radio-loud Sample. *Matthew A. Malkan*. **287**, 555, 140-C1 (1984)
- The Luminous Host Galaxy and Anomalous Brackett-Gamma Line of Markarian 231. *Roc M. Cutri, G. H. Rieke, and M. J. Lebofsky*. **287**, 566, 140-C12 (1984)
- Recognizing Merger Remnants among Normal Elliptical Galaxies: NGC 5813. *John Kormendy*. **287**, 577, 140-D9 (1984)
- SAS 3 Survey of the Soft X-Ray Background. *Frederic J. Marshall and George W. Clark*. **287**, 633, 141-B5 (1984)

Galaxies: Structure—Continued

- K Giants and the Total Amount of Matter near the Sun. *John N. Bahcall*. **287**, 926, 144-C13 (1984)
- Blue and Near-Infrared Surface Photometry of Spiral Structure in 34 Nonbarred Grand Design and Flocculent Galaxies. *Debra Meloy Elmegreen and Bruce G. Elmegreen*. **54**, 127, 2-E13 (1984) (Abstr. in **275**, 929, 147-F2)
- Comparisons of a Standard Galaxy Model with Stellar Observations in Five Fields. *John N. Bahcall and Raymond M. Soneira*. **55**, 67, 11-E12 (1984) (Abstr. in **279**, 910, 47-G1)
- A Comparison of Distance Scales for Early-Type Galaxies. *G. de Vaucouleurs and D. W. Olson*. **56**, 91, 22-G10 (1984) (Abstr. in **283**, 907, 96-F14)
- CCD Surface Photometry of Field Galaxies. I. Observations. *Stephen M. Kent*. **56**, 105, 23-B5 (1984) (Abstr. in **283**, 907, 96-F14)
- A Surface Photometry of Edge-on Galaxies. V. The Vertical Structure of the Bar in NGC 4762. *Ken-ichi Wakamatsu and Masaru Hamabe*. **56**, 283, 26-B3 (1984) (Abstr. in **284**, 870, 108-E2)

Galaxy, The: see Galaxies: Milky Way

Gamma-Rays: Bursts

- Analysis of Solar Flare Gamma-Ray Events. *C. Kouveliotou, R. A. Treumann, and M. Scholer*. **278**, 420, 28-E1 (1984)
- Time History, Energy Spectrum, and Localization of an Unusual Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, T. L. Cline, I. V. Estulin, V. M. Zenchenko, and V. G. Kurt*. **280**, 150, 50-E14 (1984)
- An Intercontinental Baseline Coincidence Search for Optical Flashes with Two Schmidt Telescopes. *Bradley E. Schaefer, Roland Vanderspek, Hale V. Bradt, and George R. Ricker*. **283**, 887, 96-E8 (1984)
- Resonant Absorption, Hot Electrons, and Cosmic Gamma-Ray Bursts. *E. P. Liang*. **283**, L21, 91-F9 (1984)
- On the Morphology and Spectra of the Short Gamma-Ray Bursts. *C. Barat, R. I. Hayles, K. Hurley, M. Niel, G. Vedrenne, I. V. Estulin, and V. M. Zenchenko*. **285**, 791, 120-B3 (1984)
- 3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. *J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz*. **286**, 681, 130-E9 (1984)
- Two Probable Optical Flashes from Gamma-Ray Bursters. *Bradley E. Schaefer, Hale V. Bradt, C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. L. Cline, U. Desai, B. J. Teegarden, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, J. G. Laros, I. V. Estulin, and A. V. Kuznetsov*. **286**, L1, 126-D2 (1984)
- 1979 January 13: An Intense Gamma-Ray Burst with a Possible Associated Optical Transient. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, T. Cline, U. Desai, B. Schaefer, B. Teegarden, W. D. Evans, E. E. Fenimore, R. Klebesadel, J. G. Laros, I. V. Estulin, V. M. Zenchenko, A. V. Kuznetsov, V. G. Kurt, S. Ilavsky, and C. Match*. **286**, L5, 126-D7 (1984)
- Possible Short Annihilation Flashes in the 1978 November 4 Gamma-Ray Burst. *C. Barat, K. Hurley, M. Niel, G. Vedrenne, I. G. Mitrofanov, I. V. Estulin, V. M. Zenchenko, and V. Sh. Dolidze*. **286**, L11, 126-D14 (1984)
- Three Precise Gamma-Ray Burst Source Locations. *T. L. Cline, U. D. Desai, B. J. Teegarden, C. Barat, K. Hurley, M. Niel, G. Vedrenne, W. D. Evans, R. W. Klebesadel, J. G. Laros, I. V. Estulin, A. V. Kuznetsov, V. M. Zenchenko, V. G. Kurt, and B. E. Schaefer*. **286**, L15, 126-F3 (1984)

Gamma-Rays: General

- On the Thermonuclear Origin of the Gamma-Rays from SS 433. *R. N. Boyd, M. Wiescher, G. H. Newsom, and G. W. Collins II*. **276**, L9, 5-E9 (1984)
- An Identification for "Gemina" (2CG 195 + 04): The Optical Counterpart of 1E 0630 + 178, A Unique Object in the Gamma-Ray Source Error Box. *Patrizia A. Caraveo, Giovanni F. Bignami, Laurent Vigroux, and Jacques A. Paul*. **276**, L45, 10-F2 (1984)
- Is Quasar QS 0630 + 180 Found in the Gamma-Ray Error Box of CG 195 + 4 a Proton Quasar? *R. Schlickeiser*. **277**, 485, 17-D3 (1984)
- Search for Discrete Gamma-Ray Sources Emitting at Energies Greater than 10^{15} eV. *M. Samorski and W. Stamm*. **277**, 897, 21-G9 (1984)
- The Gamma-Ray Spectrum of Centaurus A: A High-Resolution Observation between 70 keV and 8 MeV. *N. Gehrels, T. L. Cline, B. J. Teegarden, W. S. Paciesas, J. Tueller, Ph. Durouchoux, and J. M. Hameury*. **278**, 112, 25-C4 (1984)
- HEAO 3 Observations of the Crab Pulsar. *W. A. Mahoney, J. C. Ling, and A. S. Jacobson*. **278**, 784, 34-D12 (1984)
- The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. *J. B. G. M. Bloemen, L. Blitz, and W. Hermsen*. **279**, 136, 38-D9 (1984)
- Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. *W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini*. **279**, 555, 44-A1 (1984)

The Bremsstrahlung Component of the Diffuse Galactic Gamma-Ray Emission at MeV Energies. *W. Sacher and V. Schönfelder*. **279**, 817, 46-F7 (1984)

^{26}Al in the Interstellar Medium. *Donald D. Clayton*. **280**, 144, 50-E8 (1984)

Two-Temperature Model of Spherical Accretion onto a Black Hole. *M. Colpi, L. Maraschi, and A. Treves*. **280**, 319, 52-D11 (1984)

Relativistic Jet Meets Target: The Gamma-Rays from 3C 273. *Philip Morrison, Dana Roberts, and Alberto Sadun*. **280**, 483, 55-B9 (1984)

Gamma-Rays from Rotating Black Holes. *N. Panchapakesan and Vijay Prakash*. **280**, 848, 59-A14 (1984)

First Observation of Gamma-Rays from Vela X-1 at Energies Greater than 3×10^{15} eV. *R. J. Protheroe, R. W. Clay, and P. R. Gerhardt*. **280**, L47, 60-D10 (1984)

Search for 511 keV Electron-Positron Annihilation Radiation from Mildly Active Galaxies Using the HEAO 3 Gamma-Ray Spectrometer. *Alan P. Marscher, Kenneth Brecher, William A. Wheaton, James C. Ling, William A. Mahoney, and Allan S. Jacobson*. **281**, 566, 68-F8 (1984)

On the Detection of Positrons via the Optical Lines of Positronium. *Jeffrey E. McClintock*. **282**, 291, 77-A12 (1984)

Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. *Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest*. **283**, 439, 90-G5 (1984)

Nuclear Processes in the Jets of SS 433. *R. Ramaty, B. Kozlousky, and R. E. Lingenfelter*. **283**, L13, 91-F1 (1984)

On the Bizarre Gamma-Ray Spectrum of SS 433. *H. L. Helfer and M. P. Savedoff*. **283**, L49, 97-B12 (1984)

On the Nature of the Galactic Gamma-Ray Sources. *G. E. Morfill, M. Forman, and G. Bignami*. **284**, 856, 108-D2 (1984)

Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. *J. Boone, R. Cady, G. L. Cassiday, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech*. **285**, 264, 112-G1 (1984)

HEAO 3 Discovery of ^{26}Al in the Interstellar Medium. *W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson*. **286**, 578, 129-D14 (1984)

Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. *J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley*. **286**, L35, 132-D6 (1984)

Self-Absorption of High-Energy Gamma-Rays in Cygnus X-3. *Krishna M. V. Apparao*. **287**, 338, 136-E14 (1984)

Gas Dynamics: see Hydrodynamics

Gravitation

The Quasar Q2345 + 007A, B: A Case for the Double Gravitational Lens? *K. Subramanian and S. M. Chitre*. **276**, 440, 6-D2 (1984)

Spacetime Thermodynamics and the Inflationary Universe. *T. W. Kephart, Y. J. Ng, and H. van Dam*. **277**, 478, 17-C10 (1984)

Multifrequency Timing Measurements on the Millisecond Pulsar PRS 1937 + 214. *J. M. Cordes and Daniel R. Stinebring*. **277**, L53, 22-F4 (1984)

Gravitational Radiation from Accreting Neutron Stars. *Robert V. Wagoner*. **278**, 345, 27-F9 (1984)

Limits on the Gravitational Redshift from Neutron Stars. *Lee Lindblom*. **278**, 364, 28-A1 (1984)

Gravitational Imaging by Superclusters. *R. H. Sanders, T. S. van Albada, and T. A. Oosterloo*. **278**, L91, 36-A8 (1984)

Clump Collisions in Molecular Clouds: Gravitational Instability and Coalescence. *David L. Gilden*. **279**, 335, 40-F2 (1984)

Primordial Gravitational Waves and the Blackbody Radiation Anisotropy. *Peter J. Adams, Ronald W. Hellings, and Robert L. Zimmerman*. **280**, L39, 60-D4 (1984)

Improved Lower Limits on Lyman-Alpha Forest Cloud Dimensions and Additional Evidence Supporting the Gravitational Lens Nature of 2345 + 007A, B. *Craig B. Foltz, Ray J. Weymann, Hermann-Josef Röser, and Frederic H. Chaffee, Jr.* **281**, L1, 65-E2 (1984)

Galaxy Mass Distribution from Gravitational Light Deflection. *J. Anthony Tyson, Francisco Valdes, John F. Jarvis, and Allen P. Mills, Jr.* **281**, L59, 73-A8 (1984)

On the Emission of Gravitational Radiation from Inhomogeneous Jacobi Configurations. *James R. Ipser and Robert A. Matagan*. **282**, 287, 77-A8 (1984)

Discovery of a New Gravitational Lens. *S. Djorgovski and H. Spinrad*. **282**, L1, 78-A2 (1984)

Cosmic Strings as Gravitational Lenses. *Alexander Vilenkin*. **282**, L51, 85-A8 (1984)

On Test Particles in General Relativity. *Thomas W. Noonan*. **283**, 321, 89-E1 (1984)

Gravitational Lens Models for the Triple Radio Source MG 2016 + 112. *D. Narasimha, K. Subramanian, and S. M. Chitre*. **283**, 512, 92-D9 (1984)

- (1984)
 The Statistics of Gravitational Lenses: The Distributions of Image Angular Separations and Lens Redshifts. *Edwin L. Turner, Jeremiah P. Ostriker, and Richard J. Gott III.* **284**, 1, 98-A6 (1984)
 Gravitation in the Weak-Field Limit. *Herbert J. Rood.* **284**, 407, 102-D2 (1984)
 The Evolution of Low-Mass Close Binaries Influenced by the Radiation of Gravitational Waves and by a Magnetic Stellar Wind. *Icko Iben, Jr. and Alexander V. Tutukov.* **284**, 719, 106-G8 (1984)
 Does the Missing Mass Problem Signal the Breakdown of Newtonian Gravity? *Jacob Bekenstein and Mordehai Milgrom.* **286**, 7, 122-A11 (1984)
 Behavior of Higher Modes of Gravitational Waves and Gauge-invariant Density Perturbations in Bianchi IX Cosmological Models. *R. J. Slagter.* **286**, 379, 127-C1 (1984)
 Limits on a Stochastic Gravitational Wave Background from Observations of Terrestrial and Solar Oscillations. *S. P. Boughn and J. R. Kuhn.* **286**, 387, 127-C9 (1984)
 Long-Term Post-Newtonian Effects in a Binary System. *Miquel Portilla and Ramon Lapiedra.* **286**, 633, 130-B3 (1984)
 Image Separation Statistics for Multiply Imaged Quasars. *C. C. Dyer.* **287**, 26, 133-C5 (1984)
 The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney.* **287**, 538, 140-A11 (1984)
 Gravitational Radiation from Colliding Compact Stars: Hydrodynamical Calculations in Two Dimensions. *David L. Gilden and Stuart L. Shapiro.* **287**, 728, 142-C5 (1984)
 The Orbital Motion of DI Herculis as a Test of a Theory of Gravitation. *J. W. Moffat.* **287**, L77, 145-E1 (1984)
- Hydrodynamics**
 Thermodynamics and Galaxy Clustering: Nonlinear Theory of High Order Correlations. *William C. Saslaw and Andrew J. S. Hamilton.* **276**, 13, 1-B4 (1984)
 Continuum Models for Gas in Disturbed Galaxies. I. Model Equations. *John M. Scalo and Curtis Struck-Marcell.* **276**, 60, 1-E9 (1984)
 A Convective Model for Turbulent Mixing in Rotating Convection Zones. *David H. Hathaway.* **276**, 316, 4-C4 (1984)
 A Numerical Study of the Stability of Radiative Shocks. *James N. Imamura, Michael T. Wolff, and Richard H. Durisen.* **276**, 667, 8-G2 (1984)
 Condensation Modes in Magnetized Cylindrical Plasmas. *Chang-Hyuk An.* **276**, 755, 9-F9 (1984)
 Continuum Models for Gas in Disturbed Galaxies. II. Stability of Simplified Model Systems. *Curtis Struck-Marcell and John M. Scalo.* **277**, 132, 12-D3 (1984)
 A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. *John F. Hawley, Larry L. Smarr, and James R. Wilson.* **277**, 296, 14-B9 (1984)
 Transient Behavior of a Flare-associated Solar Wind. I. Gas Dynamics in a Radial Open Field Region. *Fukuo Nagai.* **277**, 379, 15-A8 (1984)
 On the Theory of Cosmic-Ray-Mediated Shocks with Variable Compression Ratio. *David Eichler.* **277**, 429, 15-E7 (1984)
 On the Dynamics in Evaporating Cloud Envelopes. *John L. Giuliani, Jr.* **277**, 605, 18-E14 (1984)
 Protostellar Formation in Rotating Interstellar Clouds. IV. Nonisothermal Collapse. *Alan Paul Boss.* **277**, 768, 20-E2 (1984)
 The Nonaxisymmetric Baroclinic Instability in Thin Accretion Disks. *W. Cabot.* **277**, 806, 21-A1 (1984)
 A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos.* **277**, L35, 22-E1 (1984)
 Departures from Thermal Equilibrium in Expanding Stars. *Charles A. Whitney.* **278**, 310, 27-D2 (1984)
 On the Mechanism of Decelerating the Gas Infalling onto Magnetized Neutron Stars. *A. Braun and R. Z. Yehel.* **278**, 349, 27-F13 (1984)
 Transient Behavior of Flare-associated Solar Wind. II. Gas Dynamics in a Nonradial Open Field Region. *Fukuo Nagai.* **278**, 841, 35-A13 (1984)
 Clump Collisions in Molecular Clouds: Gravitational Instability and Coalescence. *David L. Gilden.* **279**, 335, 40-F2 (1984)
 Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. *Monique Tassoul and Jean-Louis Tassoul.* **279**, 384, 41-B9 (1984)
 Stability of Self-similar Flow: Correct Form of the Basic Equations and of the Shock Boundary Conditions. *Bernard Gaffet.* **279**, 419, 41-E2 (1984)
 Criteria for Collapse and Fragmentation of Rotating, Isothermal Clouds. *Shoken M. Miyama, Chushiro Hayashi, and Shinji Narita.* **279**, 621, 44-E11 (1984)
 Hydraulic Jumps in "Viscous" Accretion Disks. *F. Curtis Michel.* **279**, 807, 46-E11 (1984)
 Gas Dynamics in the Impulsive Phase of Solar Flares. I. Thick-Target Heating by Nonthermal Electrons. *F. Nagai and A. Gordon Emslie.* **279**, 896, 47-E10 (1984)
 Colliding Winds: Interaction Regions with Strong Heat Conduction. *James N. Imamura and Roger A. Chevalier.* **280**, 313, 52-D5 (1984)
 The Production Spectrum of a Relativistic Maxwell-Boltzmann Gas. *Charles D. Dermer.* **280**, 328, 52-E6 (1984)
 Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. *Peter Bodenheimer and Ronald E. Taam.* **280**, 771, 58-C7 (1984)
 Wave-Wave Interaction in Magneto-gravitating Plasma. *S. S. Aggarwal and G. L. Kalra.* **280**, 792, 58-D14 (1984)
 The Interaction of Crab-like Supernova Remnants with Their Surroundings. *Roger A. Chevalier.* **280**, 797, 58-E5 (1984)
 The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. *Joseph E. Borowsky, Morris B. Pongratz, Robert A. Roussel-Dupré, and Tai-Ho Tan.* **280**, 802, 58-E10 (1984)
 Opacities for Comptonization Plus Emission and Absorption. *Martin A. Schwiezer.* **280**, 809, 58-F3 (1984)
 Self-similar Magnetohydrodynamics. III. The Subset of Spherically Symmetric Gasdynamic Flows. *B. C. Low.* **281**, 381, 65-B1 (1984)
 Jet Deflection by Ram Pressure and Pressure Gradients. *Ralph Fiedler and R. N. Henriksen.* **281**, 554, 68-E10 (1984)
 Nonequilibrium Analysis of Supernova Remnants in the Large Magellanic Cloud. *R. Fusco-Femiano and A. Preite-Martinez.* **281**, 593, 69-A13 (1984)
 A New Similarity Solution for Reverse Shocks in Supernova Remnants. *A. J. S. Hamilton and C. L. Sarazin.* **281**, 682, 70-A5 (1984)
 Thermal Evaporation of Spherical Clouds: Effects of Viscous Stresses. *B. T. Draine and J. L. Giuliani, Jr.* **281**, 690, 70-A13 (1984)
 Chromospheric Evaporation Velocities in Solar Flares. *George H. Fisher, Richard C. Canfield, and Alexander N. McClymont.* **281**, L79, 73-B13 (1984)
 Radiatively Driven Dust-bounded Implosion: Formation and Stability of Dense Globules. *Maxwell T. Sandford II, Rodney W. Whitaker, and Richard I. Klein.* **282**, 178, 75-G10 (1984)
 Two- and Three-Dimensional Numerical Simulations of the Core Helium Flash. *Robert G. Deupree.* **282**, 274, 76-G8 (1984)
 The Overshoot Region at the Bottom of the Solar Convection Zone. *J. H. M. M. Schmitt, R. Rosner, and H. U. Bohn.* **282**, 316, 77-C9 (1984)
 On the Stability of a New Relativistic Kinetic Equation. *Henry E. Kundrup.* **282**, 361, 79-A5 (1984)
 Stellar Acoustics. II. Pulse Resonance in Giant Star Models. *Toshiki Aikawa and Charles A. Whitney.* **282**, 527, 80-G9 (1984)
 Two-Dimensional Compressible Convection Extending over Multiple Scale Heights. *Neal E. Hurlburt, Juri Toomre, and Joseph M. Mas-saguer.* **282**, 557, 81-B11 (1984)
 On the Kelvin-Helmholtz Instabilities of Supersonic Shear Layers. *S. Roy Choudhury and R. V. E. Lovelace.* **283**, 331, 89-E11 (1984)
 On the Propagation of Acoustic Waves in a Radiating Fluid: Addendum. *Dimitri Mihalas and Barbara Weibel Mihalas.* **283**, 469, 91-B10 (1984) (Orig. paper in **273**, 355, 116-B6)
 Thermal Instability in Molecular Clouds. *David L. Gilden.* **283**, 679, 94-D1 (1984)
 Scattering of Shock Waves by a Spherical Cloud. *Satoru Ikeuchi and Lyman Spitzer, Jr.* **283**, 825, 96-A1 (1984)
 The Time Development of a Blast Wave with Shock-heated Electrons. *Richard J. Edgar and Donald P. Cox.* **283**, 833, 96-A9 (1984)
 A Conjecture concerning Thermodynamic Limits to Solar Atmospheric Heating. *Kenneth H. Schatten and Hans G. Mayr.* **283**, 853, 96-C2 (1984)
 Linear Models of Acoustic Waves in Sunspot Umbrae. *J. B. Gurman and J. W. Leibacher.* **283**, 859, 96-C8 (1984)
 Self-consistent Radiation-hydrodynamic Equations for Stellar Oscillations. I. Nonlinear Form. *Barbara Weibel Mihalas.* **284**, 299, 101-C6 (1984)
 Optically Thick Ablation Fronts. *Arieh Königl.* **284**, 303, 101-C10 (1984)
 On the Fission Theory of Binary Stars. IV. Exact Solutions in Polynomial Spaces. *N. R. Lebovitz.* **284**, 364, 102-A1 (1984)
 Collapse of Anisotropic Spheres in General Relativity: An Analytical Model. *J. M^a. Ibañez.* **284**, 381, 102-B4 (1984)
 The Effect of Line-Tying on the Radiative MHD Stability of Coronal Plasmas with Radial Pressure Profile. *Chang-Hyuk An.* **284**, 422, 102-E3 (1984)
 Minimum Entropy Production in the Steady State and Radiative Transfer. *Christopher Essex.* **285**, 279, 113-A5 (1984)
 Linear Astrophysical Dynamos in Rotating Spheres: Solar and Stellar Cycle North-South Hemispheric Parity Selection Mechanism and

Hydrodynamics—Continued

- Turbulent Magnetic Diffusivity. *Hirokazu Yoshimura, Fei Wu, and Zhengzhi Wang.* **285**, 325, 113-D9 (1984)
- Explosive Nucleosynthesis in Massive Stars: Comparison with the Cassiopeia A Fast-moving Knots. *M. D. Johnston and A. Yahil.* **285**, 587, 118-A4 (1984)
- The Equilibrium of Polytropic Self-gravitating Sheetlike Masses. *Miguel H. Ibañez S. and Leonardo di G. Sigalotti.* **285**, 784, 120-A10 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. *Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek.* **286**, 787, 131-F6 (1984)
- Two- and Three-dimensional Numerical Simulations of the Hydrodynamic Phase of the Core Helium Flash. *Robert G. Deupree.* **287**, 268, 135-G5 (1984)
- Helical Twisting on an Adiabatically Expanding Jet. I. Propagation and Temporal Growth. *Philip E. Hardee.* **287**, 523, 139-G10 (1984)
- Gravitational Radiation from Colliding Compact Stars: Hydrodynamical Calculations in Two Dimensions. *David L. Gilden and Stuart L. Shapiro.* **287**, 728, 142-C5 (1984)
- Planar Numerical Cosmology. II. The Difference Equations and Numerical Tests. *Joan Centrella and James R. Wilson.* **54**, 229, 4-F8 (1984) (Abstr. in **276**, 798, 10-B10)
- A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration. *John F. Hawley, Larry L. Smarr, and James R. Wilson.* **55**, 211, 13-G13 (1984) (Abstr. in **280**, 938, 60-B2)
- Hydrodynamics**
- Observations of Magnetic Fields on Solar-Type Stars. *Geoffrey W. Marcy.* **276**, 286, 4-A2 (1984)
- Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. *M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham.* **276**, 325, 4-C13 (1984)
- The Role of Flux Ejection in Stellar Dynamos. *E. N. Parker.* **276**, 341, 4-E1 (1984)
- MHD Stability of Compressible Coronal Loops with Radiative Energy Loss. *Chang-Hyuk An.* **276**, 352, 4-E12 (1984)
- A Unified Theory of Electrodynamical Coupling in Coronal Magnetic Loops: The Coronal Heating Problem. *James A. Ionson.* **276**, 357, 4-F3 (1984)
- Diamagnetic Propulsion and Energy Balance of Magnetic Elements in the Solar Chromosphere and Transition Region. *P. J. Cargill and G. W. Pneuman.* **276**, 369, 4-G1 (1984)
- Radiative Tearing: Magnetic Reconnection on a Fast Thermal Instability Time Scale. *R. S. Steinolfson and G. Van Hoven.* **276**, 391, 5-A13 (1984)
- Stimulated Compton Scattering of Hydromagnetic Waves in the Interstellar Medium. *Padma K. Shukla and John M. Dawson.* **276**, L49, 10-F7 (1984)
- Propagation and Growth of Surface Waves on a Supersonic Fluid Jet. *Philip E. Hardee.* **277**, 106, 12-B3 (1984)
- Magnetic Field Instabilities in Accretion Disks. *L. Stella and R. Rosner.* **277**, 312, 14-C11 (1984)
- Resonances of Coronal Loops. *Joseph V. Hollweg.* **277**, 392, 15-B10 (1984)
- Generation of Coronal Electric Currents Due to Convective Motions on the Photosphere. II. Resonance and Phase-Mixing of Alfvén Waves. *Takashi Sakurai and Aleck Granik.* **277**, 404, 15-C8 (1984)
- Three-dimensional Magnetostatic Atmospheres: Magnetic Field with Vertically Oriented Tension Force. *B. C. Low.* **277**, 415, 15-D5 (1984)
- MHD Stability of Sheet Equilibria Relevant for Quiescent Prominences. *J. Galindo-Trejo and K. Schindler.* **277**, 422, 15-D12 (1984)
- On the Energetics of Slow Magnetic Tearing. *D. N. Arion.* **277**, 841, 21-C8 (1984)
- Oscillating Dynamo Magnetic Field in the Presence of an External Nondynamo Field. The Influence of a Solar Primordial Field. *D. W. Boyer and E. H. Levy.* **277**, 848, 21-D1 (1984)
- Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Magnetosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. *R. F. Elsner and F. K. Lamb.* **278**, 326, 27-E4 (1984)
- Ambipolar Diffusion in Equilibrium Self-gravitating Gaseous Configurations. I. Plane-parallel Slabs. *Eugene Howard Scott.* **278**, 396, 28-C5 (1984)
- On the Topological Stability of Magnetostatic Equilibria. *K. C. Tsinganos, J. Distler, and R. Rosner.* **278**, 409, 28-D4 (1984)
- Analysis of Solar Flare Gamma-Ray Events. *C. Kouveliotou, R. A. Treumann, and M. Scholer.* **278**, 420, 28-E1 (1984)
- The Effect of Convection upon Charged Particle Transport in Random Magnetic Fields. *James A. Earl.* **278**, 825, 34-G11 (1984)
- A Static Model of Chromospheric Heating in Solar Flares: Erratum. *Paul J. Ricchiazzi and Richard C. Canfield.* **279**, 463, 42-A11 (1984) (Orig. paper in **272**, 739, 109-G5)
- Pulsar Magnetogyro Ratios and Pulsar Evolution. III. Magnetic Field Generation. *James F. Woodward.* **279**, 803, 46-E7 (1984)
- On Coronal Oscillations. *B. Roberts, P. M. Edwin, and A. O. Benz.* **279**, 857, 47-B12 (1984)
- Microwave Signature of Thick-Target Electron Beams in Solar Flares. *A. Gordon Emslie and Dean F. Smith.* **279**, 882, 47-D10 (1984)
- Imperfect Fluid Cosmologies with Thermodynamics: Some Exact Solutions. *A. A. Coley and B. O. J. Tupper.* **280**, 26, 49-C6 (1984)
- Fast-Mode Magnetohydrodynamic Waves in Coronal Holes and the Solar Wind. *Tor Flå, Shadia R. Habbal, Thomas E. Holzer, and Egil Leer.* **280**, 382, 53-B4 (1984)
- Radiative and Reconnection Instabilities: Filaments and Flares. *G. Van Hoven, T. Tachi, and R. S. Steinolfson.* **280**, 391, 53-B13 (1984)
- A Dynamic Model for the Solar Transition Region. *S. K. Antiochos.* **280**, 416, 53-D12 (1984)
- Beam-Return Current Systems in Solar Flares. *D. S. Spicer and R. N. Sudan.* **280**, 448, 53-G2 (1984)
- Depth of Origin of Solar Active Regions. *E. N. Parker.* **280**, 453, 53-E5 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Differential Rotation, Anisotropic Turbulent Magnetic Diffusivity, and Solar-Stellar Cycle Magnetic Parity. *Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu.* **280**, 865, 59-C3 (1984)
- Self-similar Magnetohydrodynamics. IV. The Physics of Coronal Transients. *B. C. Low.* **281**, 392, 65-B12 (1984)
- Magnetohydrodynamic Stability of Line-tied Coronal Arcades. II. Shearless Magnetic Fields. *Stefano Migliuolo, Peter J. Cargill, and Alan W. Hood.* **281**, 413, 65-D5 (1984)
- Comments on the MHD Stability of Coronal Plasmas with Line-Tying. *Chang-Hyuk An.* **281**, 419, 65-D11 (1984)
- Magnetic Buoyancy and the Escape of Magnetic Fields from Stars. *E. N. Parker.* **281**, 839, 71-F2 (1984)
- The Effect of Closed Boundary Conditions on a Stationary Dynamo. *Arnab Rai Choudhuri.* **281**, 846, 71-F9 (1984)
- Thermal Ripples in a Resistive and Radiative Instability. *R. S. Steinolfson.* **281**, 854, 71-G3 (1984)
- The Thermal Instability in a Sheared Magnetic Field: Filament Condensation with Anisotropic Heat Conduction. *G. Van Hoven and Y. Mok.* **282**, 267, 76-G1 (1984)
- Rapid Postglitch Spin-up of the Superfluid Core in Pulsars. *M. A. Alpar, Stephen A. Langer, and J. A. Sauls.* **282**, 533, 81-A1 (1984)
- Propagation of Axisymmetric Disturbances on a Twisted Magnetic Flux Tube. *T. J. Bogdan.* **282**, 769, 83-D10 (1984)
- Stellar Fibril Magnetic Systems. I. Reduced Energy State. *E. N. Parker.* **283**, 343, 89-F9 (1984)
- On Some Properties of Force-free Magnetic Fields in Infinite Regions of Space. *J. J. Aly.* **283**, 349, 89-G1 (1984)
- Combined Effect of Potential and Nonpotential Magnetic Fields on Equilibrium in Stellar Atmospheres. *Erast B. Gliner.* **283**, 363, 90-A1 (1984)
- MHD Kelvin-Helmholtz Instability in Extended Radio Jets. *Ralph Fielder and T. W. Jones.* **283**, 532, 92-F1 (1984)
- Magnetohydrodynamic Model of Crab Nebula Radiation. *C. F. Kennel and F. V. Coroniti.* **283**, 710, 94-F4 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Mode Transition between Steady and Oscillatory Dynamos as a Function of Dynamo Strength and Anisotropic Turbulent Magnetic Diffusivity. *Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu.* **283**, 870, 96-D5 (1984)
- The Role of the Galactic Magnetic Field in the Evolution of a Dark Globular Filament in Cygnus. *David McDavid.* **284**, 141, 99-E10 (1984)
- Relativistic Charge-separated Winds. *F. C. Michel.* **284**, 384, 102-B7 (1984)
- Density Fluctuations in the Interstellar Medium: Evidence for Anisotropic Magnetogasdynamic Turbulence. I. Model and Astrophysical Sites. *J. C. Higdon.* **285**, 109, 111-B9 (1984)
- Heating the Sun's Lower Transition Region with Fine-Scale Electric Currents. *Douglas Rabin and Ronald Moore.* **285**, 359, 113-G5 (1984)
- Convective Instability in a Solar Flux Tube. I. Nonlinear Calculations for an Adiabatic Inviscid Fluid. *S. Sirajul Hasan.* **285**, 851, 120-F9 (1984)
- The Kinematics of the Crab Nebula's Jet. *Peter Shull, Jr., Uri Carsenty, Michael Sarcander, and Thorsten Neckel.* **285**, L75, 121-F9 (1984)
- On the Large-Scale Magnetostatic Coronal Structures and Their Stability. *B. C. Low.* **286**, 772, 131-E5 (1984)
- The Heating of Cloud-Hot Phase Interface Regions by the Dissipation of Hydromagnetic Waves. *T. W. Hartquist and G. E. Morfill.* **287**, 194, 135-A13 (1984)
- Detailed Studies of the Dynamics and Energetics of Coronal Bullets. *Judith T. Karpen, Elaine S. Oran, and Jay P. Boris.* **287**, 396, 137-C4 (1984)

- A Case for Submergence of Magnetic Flux in a Solar Active Region. Douglas Rabin, Ronald Moore, and M. J. Hagyard. **287**, 404, 137-C12 (1984)
- The Relation between Stellar Rotation Rate and Activity Cycle Periods. Robert W. Noyes, Nigel O. Weiss, and Arthur H. Vaughan. **287**, 769, 142-F6 (1984)
- H II Regions:** see Nebulae
- Infrared: General**
- Diffraction-limited Spatial Resolution of Circumstellar Dust Shells at 10 Microns. E. E. Bloemhof, C. H. Townes, and A. H. B. Vanderwyck. **276**, L21, 5-F10 (1984)
- Far-Infrared and Submillimeter Observations of the Low-Luminosity Protostars L1455 FIR and L1551 IRS 5: The Confinement of Bipolar Outflows. J. A. Davidson and D. T. Jaffe. **277**, L13, 16-A13 (1984)
- The Infrared Astronomical Satellite (IRAS) Mission. G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young. **278**, L1, 29-C3 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- IRAS Observations of the Diffuse Infrared Background. M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker. **278**, L15, 29-D4 (1984)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- Optical and Infrared Photometry of Late-Type Stars in the Pleiades. John R. Stauffer. **280**, 189, 51-B3 (1984)
- Observations of the Brightness Profile of the Sun in the 30–200 Micron Continuum. C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley. **281**, 862, 71-G11 (1984)
- Temporal Variations in the Solar Submillimeter Continuum. C. Lindsey and C. Kaminski. **282**, L103, 85-E5 (1984)
- The Detectability of Population III "Jupiters". H. Karimabadi and L. Blitz. **283**, 169, 87-G11 (1984)
- High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. Gary L. Grasdalen, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castelaz. **283**, L57, 97-C6 (1984)
- JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. McAlary, R. McGonagall, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- Infrared: Sources**
- Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey. **276**, 551, 7-E9 (1984)
- Solar Limb Brightening at 820 Microns. C. Lindsay, T. de Graauw, C. de Vries, and S. Lidholm. **277**, 424, 15-D14 (1984)
- The Near-Infrared Continuum Emission of Visual Reflection Nebulae. K. Sellgren. **277**, 623, 18-G4 (1984)
- The Infrared Dust Shell around the WC9 Star Ve 2-45. H. M. Dyck, Theodore Simon, and R. D. Wolstencroft. **277**, 675, 19-D14 (1984)
- Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno. **278**, 150, 25-F2 (1984)
- Infrared Observations of Dust Cloud Structure in Young R Associations. NGC 1333, S68, and NGC 7129. Paul M. Harvey, Bruce A. Wilking, and Marshall Joy. **278**, 156, 25-F8 (1984)
- Star Formation in the M8E Region. M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders. **278**, 170, 25-G8 (1984)
- An Infrared Spatial Study of the Planetary Nebula BD + 30°3639. A. F. Bentley, J. A. Hackwell, G. L. Grasdalen, and R. D. Gehrz. **278**, 665, 33-B14 (1984)
- Far-Infrared Studies of Herbig-Haro Objects and Their Exciting Stars. Martin Cohen, Paul M. Harvey, Richard D. Schwartz, and Bruce A. Wilking. **278**, 671, 33-C6 (1984)
- The IRAS Minisurvey. M. Rowan-Robinson, P. E. Clegg, C. A. Beichman, G. Neugebauer, B. T. Soifer, H. H. Aumann, D. A. Beintema, N. Boggess, J. P. Emerson, T. N. Gautier, F. C. Gillett, M. G. Hauser, J. R. Houck, F. J. Low, and R. G. Walker. **278**, L7, 29-C9 (1984)
- Observations of Comet IRAS-Araki-Alcock 1983d. R. G. Walker, H. H. Aumann, J. Davies, S. Green, T. de Jong, J. R. Houck, and B. T. Soifer. **278**, L11, 29-C14 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- Far-Infrared Observations of the Crab Nebula. P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olmon. **278**, L29, 29-E3 (1984)
- IRAS Observations of Two Early-Type Pre-Main-Sequence Stars in the Association Chamaeleon I. P. R. Wesselius, D. A. Beintema, and F. M. Olmon. **278**, L37, 29-E10 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46–47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- IRAS Images of the Galactic Center. T. N. Gautier, M. G. Hauser, C. A. Beichman, F. J. Low, G. Neugebauer, M. Rowan-Robinson, H. H. Aumann, N. Boggess, J. P. Emerson, S. Harris, J. R. Houck, R. E. Jennings, and P. L. Marsden. **278**, L57, 29-G4 (1984)
- Infrared Emission from M31. H. J. Habing, G. Miley, E. Young, B. Baud, N. Boggess, P. E. Clegg, T. de Jong, S. Harris, E. Raimond, M. Rowan-Robinson, and B. T. Soifer. **278**, L59, 30-A1 (1984)
- Unidentified Point Sources in the IRAS Minisurvey. J. R. Houck, B. T. Soifer, G. Neugebauer, C. A. Beichman, H. H. Aumann, P. E. Clegg, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, M. Rowan-Robinson, and R. G. Walker. **278**, L63, 30-A7 (1984)
- IRAS Observations of Shapley-Ames Galaxies. T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond. **278**, L67, 30-C1 (1984)
- Infrared Galaxies in the IRAS Minisurvey. B. T. Soifer, M. Rowan-Robinson, J. R. Houck, T. de Jong, G. Neugebauer, H. H. Aumann, C. A. Beichman, N. Boggess, P. E. Clegg, J. P. Emerson, F. C. Gillett, H. J. Habing, M. G. Hauser, F. J. Low, G. Miley, and E. Young. **278**, L71, 30-C5 (1984)
- The Infrared Properties of Galaxy Clusters: IRAS Observations of the Hercules Cluster (Abell 2151). E. Young, B. T. Soifer, F. J. Low, G. Neugebauer, M. Rowan-Robinson, G. Miley, P. E. Clegg, T. de Jong, and T. N. Gautier. **278**, L75, 30-C9 (1984)
- A 25 Micron Component in 3C 390.3. G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young. **278**, L79, 30-C14 (1984)
- IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
- Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley. **279**, 162, 38-F11 (1984)
- 2 to 20 Micron Observations of Mass Loss from Early-Type Stars. David C. Abbott, C. M. Telesco, and Sidney C. Wolff. **279**, 225, 39-D14 (1984)
- The Formation of Massive Stars along the W5 Ionization Front. B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering. **279**, 291, 40-B12 (1984)
- VLA Observations of 1612 and 1667 MHz OH Masers Associated with IRC +10420. P. F. Bowers. **279**, 350, 40-G3 (1984)
- The Polarization of the SiO Masers in Orion: Maser Emission from a

Infrared Sources—Continued

- Rotating, Expanding Disk? Richard Barvainis. **279**, 358, 40-B11 (1984)
- Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. Bel Campbell and Rodger I. Thompson. **279**, 650, 45-A5 (1984)
- The Molecular Cloud Associated with the Infrared Source GL 437. Richard Arquilla and Paul F. Goldsmith. **279**, 664, 45-B5 (1984)
- High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio. **279**, 685, 45-C12 (1984)
- Dense Cores in Dark Clouds: Young Embedded Stars at 2 Micrometers. P. J. Benson, P. C. Myers, and E. L. Wright. **279**, L27, 42-E13 (1984)
- The Massive Core of W51. D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand. **279**, L51, 48-B8 (1984)
- Silane in IRC +10216. D. M. Goldhaber and A. L. Betz. **279**, L55, 48-B12 (1984)
- Infrared Observations of the 3C 273 Jets. J. Patrick Henry, E. E. Becklin, and C. M. Telesco. **280**, 98, 50-B1 (1984)
- Infrared Mapping of the M87 Jet. N. E. B. Killen, G. V. Bicknell, A. R. Hyland, and T. J. Jones. **280**, 126, 50-D3 (1984)
- NGC 2024: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein. **280**, 154, 50-F5 (1984)
- The Sub-Arc Second Structure of IRC2 at 5 Microns. A. Chelli, C. Perrier, and P. Léna. **280**, 163, 50-F14 (1984)
- 1–20 Micron Infrared Photometry of 3CR Radio Galaxies. Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward. **280**, 514, 56-B5 (1984)
- The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner. **280**, 521, 55-E6 (1984)
- NGC 6334-V—An Infrared Bipolar Nebula. Paul M. Harvey and Bruce A. Wilking. **280**, L19, 54-D9 (1984)
- The Kleinmann-Low Nebula: An Infrared Cavity. C. G. Wynn-Williams, R. Genzel, E. E. Becklin, and D. Downes. **281**, 172, 62-F14 (1984)
- Far-Infrared Observations of Southern Herbig-Haro Objects. Martin Cohen, Richard D. Schwartz, Paul M. Harvey, and Bruce A. Wilking. **281**, 250, 63-E12 (1984)
- Evidence for an Infrared Disk in the Core of the Extraordinary Planetary Nebula Abell 30. Harriet L. Dinerstein and Daniel F. Lester. **281**, 702, 70-B11 (1984)
- An Infrared Disk at the Center of the Bipolar Planetary Nebula NGC 6302. Daniel F. Lester and Harriet L. Dinerstein. **281**, L67, 73-B2 (1984)
- The Distance to NGC 2403 Based on Near-Infrared Observations of Cepheids. Christopher W. McAlary and Barry F. Madore. **282**, 101, 75-A13 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. Paul Hertz and Jonathan E. Grindlay. **282**, 118, 75-C2 (1984)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper. **282**, 427, 79-G4 (1984)
- The Inner Core of a Bok Globule. Terry Jay Jones, A. R. Hyland, and Jeremy Bailey. **282**, 675, 82-D5 (1984)
- High-Latitude Molecular Clouds. Leo Blitz, Loris Magnani, and Lee Mundy. **282**, L9, 78-A9 (1984)
- Comet 1983d: A Contrast between Data from IRAS and Data from the Ground. Michael F. A'Hearn and Robert L. Millis. **282**, L43, 78-D2 (1984)
- High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto. **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto. **282**, L73, 85-C6 (1984)
- Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson. **282**, L81, 85-C12 (1984)
- Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^{\circ}5$ to $l = 17^{\circ}5$. M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall. **283**, 566, 93-A10 (1984)
- Far-Infrared and CO Observations of the W33 Complex. M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino. **283**, 573, 93-B4 (1984)
- A Far-Infrared Survey of the Galactic Center. Sten F. Odenwald and Giovanni G. Fazio. **283**, 601, 93-D14 (1984)
- The Dust Content of the Planetary Nebula IC 3568. Martin Cohen, J. Patrick Harrington, and Rhys Hess. **283**, 687, 94-D9 (1984)
- The Remarkable Infrared Galaxy Arp 220 = IC 4553. B. T. Soifer, George Helou, Carol J. Lonsdale, G. Neugebauer, G. Hacking, J. R. Houck, F. J. Low, W. Rice, and M. Rowan-Robinson. **283**, L1, 91-E3 (1984)
- Effects of Dust on the Infrared Emission, Selected Line Ratios, and Polarization of Seyfert 1 Galaxies, Broad-Line Radio Galaxies, and Quasars. Richard J. Rudy. **284**, 33, 98-C10 (1984)
- Infrared and Millimeter-Wave Observations of the Sharpless 156 Molecular Cloud. Marshall Joy, Neal J. Evans II, Paul M. Harvey, and Bruce A. Wilking. **284**, 161, 99-G5 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper. **284**, 597, 105-E12 (1984)
- Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. D. T. Jaffe, J. A. Davidson, M. Dragovan, and R. H. Hildebrand. **284**, 637, 106-A10 (1984)
- Infrared Emission from Accretion Disks: Detectability and Variability. J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke. **284**, 745, 107-B9 (1984)
- Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga. **284**, 799, 107-F8 (1984)
- Detection of Submillimeter Polarization in the Orion Nebula. R. H. Hildebrand, M. Dragovan, and G. Novak. **284**, L51, 109-C7 (1984)
- Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^{\circ}$ to $l = +62^{\circ}$: Structure and Energetics of the Inner Disk. M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung. **285**, 74, 110-F14 (1984)
- Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen. **285**, 515, 117-B6 (1984)
- The Distribution of HCN in the Circumstellar Envelope of IRC +10216. J. H. Bieging, B. Chapman, and W. J. Welch. **285**, 656, 118-F3 (1984)
- The Location of Infrared Sources in the Galactic Center from a Deep 1 Micron CCD Image. J. P. Henry, D. L. DePoy, and E. E. Becklin. **285**, L27, 114-G12 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Clausen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- Infrared Photometry of Globular Clusters in M31. Michael L. Sitko. **286**, 209, 124-C1 (1984)
- Thermal and Maser Molecular Lines from the Envelope of IRC +10216. Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner. **286**, 276, 125-A1 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum. **286**, 302, 125-C1 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen. **286**, 573, 129-D9 (1984)
- Spectrophotometry of Compact Embedded Infrared Sources in the 0.6–1.0 Micron Wavelength Region. P. J. McGregor, S. E. Persson, and J. G. Cohen. **286**, 609, 129-G4 (1984)
- Infrared Observations of Interacting/Merging Galaxies. Carol J. Lonsdale, S. E. Persson, and K. Matthews. **287**, 95, 134-A7 (1984)
- New Radio Sources at AFGL 2591: Young Cluster or Single Star? Bel Campbell. **287**, 334, 136-E10 (1984)
- The Nature of the Embedded Population in the Rho Ophiuchi Dark Cloud: Mid-Infrared Observations. Charles J. Lada and Bruce A. Wilking. **287**, 610, 140-G8 (1984)
- An Estimate of Star Formation Efficiency in Molecular Clouds. T. N. Rengarajan. **287**, 671, 141-E12 (1984)
- Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar

- Nebulae. *H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith.* **287**, 801, 143-A10 (1984)
- Far-Infrared Photometry of Compact Extragalactic Sources: OJ 287 and BL Lacertae. *Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking.* **287**, L9, 138-C10 (1984)
- CO Emission from IRAS Galaxies. *Judith S. Young, Jeffrey Kenney, Steven D. Lord, and F. Peter Schloerb.* **287**, L65, 145-C14 (1984)
- Infrared Spectra**
- Infrared and Far-Infrared Transition Frequencies for the CH₂ Radical. *Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown.* **276**, 399, 5-B7 (1984)
- 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult.* **276**, 533, 7-D4 (1984)
- Infrared Molecular Emissions from Comets. *H. A. Weaver and M. J. Mumma.* **276**, 782, 10-A8 (1984)
- The Infrared Signature of Graphite Grains. *B. T. Draine.* **277**, L71, 22-G8 (1984)
- Comet Cernis: Icy Grains at Last? *Martha S. Hanner.* **277**, L75, 23-A1 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga.* **278**, 530, 31-F9 (1984)
- IRAS Spectra of Planetary Nebulae. *S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olmon, and P. R. Wesselius.* **278**, L33, 29-E7 (1984)
- IRAS Observations of OH/IR Stars. *F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch.* **278**, L41, 29-E13 (1984)
- Narrow-Band Infrared Photometry of the Peculiar White Dwarf LHS 1126. *M. J. Lebofsky and James Liebert.* **278**, L111, 36-B13 (1984)
- Observations of Infrared Hydrogen Recombination Line Emission from External Galaxies. *S. C. Beck, S. Beckwith, and Ian Gatley.* **279**, 563, 44-A9 (1984)
- Interstellar Absorption Lines in the Infrared Spectrum of NGC 2024 IRS 2. *John H. Black and S. P. Willner.* **279**, 673, 45-B14 (1984)
- Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. *Irene Cruz-Gonzalez, B. McBreen, and G. G. Fazio.* **279**, 679, 45-C6 (1984)
- Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. *Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and J. W. V. Storey.* **279**, L1, 42-D3 (1984)
- Silane in IRC +10216. *D. M. Goldhaber and A. L. Betz.* **279**, L55, 48-B12 (1984)
- Helium I $\lambda 10830$ Line Strengths in Planetary Nebulae. *J. Norman Scrimger.* **280**, 170, 50-G7 (1984)
- The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. *Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr.* **281**, 303, 64-C1 (1984)
- Photometric Study of NGC 2023 in the 3500 Å to 10000 Å Region: Confirmation of a Near-IR Emission Process in Reflection Nebulae. *Adolf N. Witt, Rudolph E. Schild, and James B. Krizan.* **281**, 708, 70-C3 (1984)
- The Unusual 8–13 Micron Spectrum of Markarian 231. *J. D. Bregman and F. C. Witteborn.* **281**, L17, 65-F3 (1984)
- Detection of the [Ne III] 36 Micron Line in the Planetary Nebula NGC 6543. *M. A. Shure, J. R. Houck, G. E. Gull, and T. Herter.* **281**, L29, 65-G1 (1984)
- The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. *A. J. Sauval, N. Grevesse, J. W. Brault, G. M. Stokes, and R. Zander.* **282**, 330, 77-D9 (1984)
- Infrared Photometry of Comet Bowell and Other Comets. *Michael F. A'Hearn, Eliahu Dwek, and Alan T. Tokunaga.* **282**, 803, 83-G4 (1984)
- The Helium Abundance of Saturn from Voyager Measurements. *B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein.* **282**, 807, 83-G8 (1984)
- Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. *M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson.* **282**, L81, 85-C12 (1984)
- The $v = 0 \rightarrow 0$ Spectrum of H₂. *D. E. Jennings, S. L. Bragg, and J. W. Brault.* **282**, L85, 85-D2 (1984)
- Lyman and Balmer Continuum Ionization in Zero-Age Main-Sequence Stars: Applications to the Line Excess Phenomenon. *Rodger I. Thompson.* **283**, 165, 87-G7 (1984)
- Velocity-resolved Infrared Spectroscopy of LkH α 101. *M. Simon and L. Cassar.* **283**, 179, 88-A7 (1984)
- The Infrared Ca II Triplet: A Luminosity Indicator for Stellar Population Synthesis. *Janet E. Jones, Danielle M. Alloin, and Bernard J. T. Jones.* **283**, 457, 91-A11 (1984)
- Hydrogen Dimer Structures in the Far-Infrared Spectra of Jupiter and Saturn. *Lothar Frommhold, Robert Samuelson, and George Birnbaum.* **283**, L79, 97-D14 (1984)
- He I $\lambda 10830$ Emission in Seyfert Galaxies and QSOs. *P. D. LeVan, R. C. Puetter, Harding E. Smith, and Richard J. Rudy.* **284**, 23, 98-B14 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. *T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Gatley, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin.* **284**, 118, 99-D1 (1984)
- Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. *Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke.* **284**, L5, 103-A6 (1984)
- The H⁺ Flux Peak and the Hydrogen Abundance in N Type Carbon Stars. *J. H. Goebel and H. R. Johnson.* **284**, L39, 109-B9 (1984)
- Optical Properties of Interstellar Graphite and Silicate Grains. *B. T. Draine and Hyung Mok Lee.* **285**, 89, 111-A3 (1984)
- Position-dependent Infrared Spectroscopy of M82: 100,000 Orion Nebulae? *B. Jones and J. M. Rodriguez-Espinoza.* **285**, 580, 117-G11 (1984)
- Infrared Molecular Emissions from Comets: Erratum. *H. A. Weaver and M. J. Mumma.* **285**, 872, 121-A3 (1984) (Orig. paper in **276**, 782, 10-A8)
- Submillimeter Continuum Observations of M82. *D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand.* **285**, L31, 115-A2 (1984)
- Brackett-Alpha Line Profiles of Young Stellar Objects. *S. E. Persson, T. R. Geballe, Peter J. McGregor, Suzan Edwards, and Carol J. Lonsdale.* **286**, 289, 125-A14 (1984)
- The Luminous Host Galaxy and Anomalous Brackett-Gamma Line of Markarian 231. *Roc M. Cutri, G. H. Rieke, and M. J. Lebofsky.* **287**, 566, 140-C12 (1984)
- Absorption Features in the 5–8 Micron Spectra of Protostars. *A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn.* **287**, 697, 142-A1 (1984)
- The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager Iris Spectra: NH₃, PH₃, C₂H₂, C₂H₄, CH₃D, CH₄, and the Saturnian D/H Isotopic Ratio. *R. Courtin, D. Gautier, A. Marén, B. Bezard, and R. Hanel.* **287**, 899, 144-A14 (1984)
- The Electron Density in M82 from the S III Mid-Infrared Line Ratio. *J. R. Houck, M. A. Shure, G. E. Gull, and T. Herter.* **287**, L11, 138-C12 (1984)
- The Electron Density in the Galactic Center as Derived from the S III 18.71/33.47 Micron Line Ratio. *T. Herter, J. R. Houck, M. Shure, G. E. Gull, and P. Graf.* **287**, L15, 138-D1 (1984)
- Infrared Spectrum of the Laboratory-Synthesized Quenched Carbonaceous Composite (QCC): Comparison with the Infrared Unidentified Emission Bands. *Akira Sakata, Setsuko Wada, Toshihiko Tanabé, and Takashi Onaka.* **287**, L51, 138-F9 (1984)
- An Atlas of Late-Type Stellar Spectra, 2400–2778 Inverse Centimeters. *Stephen T. Ridgway, Duane F. Carbon, Donald N. B. Hall, and Jack Jewell.* **54**, 177, 4-A2 (1984) (Abstr. in **276**, 798, 10-B10)
- Time Series Infrared Spectroscopy of Mira Variables. II. CO $\Delta_v = 3$ in Eight Mira Variables and One SRA Variable. *Kenneth H. Hinkle, Werner W. G. Scharlach, and Donald N. B. Hall.* **56**, 1, 22-A2 (1984) (Abstr. in **283**, 905, 96-F12)
- Instabilities**
- Two-Fluid Gravitational Instabilities in a Galactic Disk. *Chanda J. Jog and P. M. Solomon.* **276**, 114, 2-B9 (1984)
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. *Chanda J. Jog and P. M. Solomon.* **276**, 127, 2-C8 (1984)
- Radiative Tearing: Magnetic Reconnection on a Fast Thermal Instability Time Scale. *R. S. Steinolfson and G. Van Hoven.* **276**, 391, 5-A13 (1984)
- A Numerical Study of the Stability of Radiative Shocks. *James N. Imamura, Michael T. Wolff, and Richard H. Durisen.* **276**, 667, 8-G2 (1984)
- Stability of Gravitational Systems and Gravothermal Catastrophe in Astrophysics. *J. F. Sygnet, G. Des Forêts, M. Lachièze-Rey, and R. Pellat.* **276**, 737, 9-E5 (1984)
- Magnetic Field Instabilities in Accretion Disks. *L. Stella and R. Rosner.* **277**, 312, 14-C11 (1984)
- Radiative and Reconnection Instabilities: Filaments and Flares. *G. Van Hoven, T. Tachi, and R. S. Steinolfson.* **280**, 391, 53-B13 (1984)
- Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. *R. R. Sharma and Loukas Vlahos.* **280**, 405, 53-D1 (1984)
- Comments on the MHD Stability of Coronal Plasmas with Line-Tying. *Chang-Hyuk An.* **281**, 419, 65-D11 (1984)

Instabilities—Continued

Thermal Ripples in a Resistive and Radiative Instability. *R. S. Steinolfson*. **281**, 854, 71-G3 (1984)

Spiral Instabilities Provoked by Accretion and Star Formation. *J. A. Sellwood and R. G. Carlberg*. **282**, 61, 74-E12 (1984)

Instabilities in Line-driven Stellar Winds. I. Dependence on Perturbation Wavelength. *S. P. Owocki and G. B. Rybicki*. **284**, 337, 101-F2 (1984)

Instruments

The Infrared Astronomical Satellite (IRAS) Mission. *G. Neugebauer, H. J. Habing, R. van Duinen, H. H. Aumann, B. Baud, C. A. Beichman, D. A. Beintema, N. Boggess, P. E. Clegg, T. de Jong, J. P. Emerson, T. N. Gautier, F. C. Gillett, S. Harris, M. G. Hauser, J. R. Houck, R. E. Jennings, F. J. Low, P. L. Marsden, G. Miley, F. M. Olmon, S. R. Pottasch, E. Raimond, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, P. R. Wesselius, and E. Young*. **278**, L1, 29-C3 (1984)

Interpretation of Absolute Line Intensities on the NRAO 11 Meter and Other Millimeter Wave Telescopes. *M. L. Kutner, L. Mundy, and R. J. Howard*. **283**, 890, 96-E11 (1984)

The Magnetic Fields of the Late-Type Stars. *Ermanno F. Borra, Geoffrey Edward, and M. Mayor*. **284**, 211, 100-D2 (1984)

5 GHz Source Variability and the Gain of the NRAO 300 Foot Telescope. *C. L. Bennett, C. R. Lawrence, and B. F. Burke*. **54**, 211, 4-E5 (1984) (Abstr. in **276**, 798, 10-B10)

Interferometry

VLBI Study of 1038 + 528 A and B: Discovery of Wavelength Dependence of Peak Brightness Location. *J. M. Marcaide and I. I. Shapiro*. **276**, 56, 1-E5 (1984)

Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. *Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer*. **276**, 480, 6-G3 (1984)

The Radio Structure of CTA 21. *Dayton L. Jones*. **276**, L5, 5-E5 (1984)

Shell Structure in Ultracompact H II Regions. *B. E. Turner and H. E. Matthews*. **277**, 164, 12-F9 (1984)

High-Resolution Observations of the Steep Spectrum Source 2147 + 145. *W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Bååth, and J. Romney*. **277**, L41, 22-E6 (1984)

The Radio Morphology of Blazars and Relationships to Optical Polarization and to Normal Radio Galaxies. *J. F. C. Wardle, Richard L. Moore, and J. R. Angel*. **279**, 93, 38-A9 (1984)

The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. *N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth*. **279**, 116, 38-C3 (1984)

Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. *Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips*. **279**, 184, 39-A8 (1984)

VLA Observations of 1612 and 1667 MHz OH Masers Associated with IRC +10420. *P. F. Bowers*. **279**, 350, 40-G3 (1984)

VLA Observations of Fine Structures in a Solar Active Region at 6 Centimeter Wavelength. *D. McConnell and M. R. Kundu*. **279**, 421, 41-E4 (1984)

Very Large Array Observations of Solar Active Regions. IV. Structure and Evolution of Radio Bursts from 20 Centimeter Loops. *Robert F. Willson and Kenneth R. Lang*. **279**, 427, 41-E10 (1984)

The Peculiar Galaxy IC 4553: VLA-A Observations of the OH Megamaser. *Willem A. Baan and Aubrey D. Haschick*. **279**, 541, 43-F12 (1984)

The Sub-Arc Second Structure of IRC2 at 5 Microns. *A. Chelli, C. Perrier, and P. Léna*. **280**, 163, 50-F14 (1984)

VLA Observations of T Tauri Stars. II. A Luminosity-limited Survey of Taurus-Auriga. *J. H. Bieging, Martin Cohen, and P. R. Schwartz*. **282**, 699, 82-F4 (1984)

Detection of a Sub-Millarcsecond Radio Component in the RS CVn System 1099. *Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston*. **282**, L23, 78-B12 (1984)

VLA Observations of Collimated Outflow at NGC 7538 IRS 1. *Bel Campbell*. **282**, L27, 78-C2 (1984)

Extended Radio Observations of the SNR CTB 109. *V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner*. **283**, 147, 87-F1 (1984)

Three-dimensional Structures of Two Solar Active Regions from VLA Observations at 2, 6, and 20 Centimeter Wavelengths. *R. K. Shevgaonkar and M. R. Kundu*. **283**, 413, 90-D14 (1984)

Radio Jets in Classical Double Radio Sources with Strong Cores. *Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia*. **283**, 515, 92-D12 (1984)

Kinematics and Dynamics of the H II Region Sharpless 142. I. The Velocity Field of the Ionized Hydrogen. *Gilles Joncas and Jean-René*

Roy. **283**, 640, 94-A1 (1984)

Interaction of the Outflow and Quiescent Gas in Orion: HCO⁺ Aperture Synthesis Maps. *S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch*. **283**, 655, 94-B2 (1984)

Interferometric Observations of CO in Orion: Hot Core and Plateau. *C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **283**, L37, 97-A14 (1984)

The Sub-Millarcsecond Radio Structure of AO 0235 + 164. *Dayton L. Jones, Lars B. Bååth, Michael M. Davis, and Stephen C. Unwin*. **284**, 60, 98-E9 (1984)

A Search at the Millijansky Level for Milli-arcsecond Cores in a Complete Sample of Radio Galaxies. *Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin I. Shapiro, Alan E. E. Rogers, and Antonio Ruis*. **284**, 519, 104-G1 (1984)

Radio Continuum Activity in the Elliptical Galaxy NGC 1052. *J. M. Wrobel*. **284**, 531, 104-G13 (1984)

The Jet and Filaments in Cygnus A. *R. A. Perley, J. W. Dreher, and J. J. Cowan*. **285**, L35, 115-A5 (1984)

Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. *M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody*. **285**, L79, 121-G2 (1984)

Very High Resolution Observations of Compact Sources in the Direction of Supernova Remnants: G74.87 + 1.22. *Barry J. Geldzahler, David B. Shaffer, and Helmut Kühr*. **286**, 284, 125-A9 (1984)

VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. *W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanroma, and A. Rius*. **286**, 503, 128-E13 (1984)

A Search for Changing Structure in Low-Luminosity Compact Radio Sources. *Dayton L. Jones*. **287**, 33, 133-C12 (1984)

Compact-Core-dominated Radio Emission from Bright E/S0 Galaxies. *J. M. Wrobel and D. S. Heeschen*. **287**, 41, 133-D5 (1984)

The Milli-arcsecond Images of Q0957 + 561. *M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney*. **287**, 538, 140-A11 (1984)

Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. *H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith*. **287**, 801, 143-A10 (1984)

Discovery of a Young Stellar Object near the Water Masers in W3(OH). *J. L. Turner and W. J. Welch*. **287**, L81, 145-E6 (1984)

Speckle Interferometric Measurements of Binary Stars. IX. *Harold A. McAlister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel*. **54**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)

High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis*. **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)

Interplanetary Medium

IRAS Observations of the Diffuse Infrared Background. *M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker*. **278**, L15, 29-D4 (1984)

Infrared Cirrus: New Components of the Extended Infrared Mission. *F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius*. **278**, L19, 29-D8 (1984)

Estimate of Cosmic-Ray Latitudinal Gradient in 1981–1982. *R. B. Decker, S. M. Krimigis, and D. Venkatesan*. **278**, L119, 36-C7 (1984)

Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. *G. M. Mason, G. Gloeckler, and D. Hovestadt*. **280**, 902, 59-E14 (1984)

Type II Solar Radio Bursts, Interplanetary Shocks, and Energetic Particle Events. *H. V. Cane and R. G. Stone*. **282**, 339, 77-E4 (1984)

Survey of He⁺/He²⁺ Abundance Ratios in Energetic Particle Events. *D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer*. **282**, L39, 78-C12 (1984)

Shock Acceleration of Nuclei and Electrons in the Heliosphere beyond 24 AU. *K. R. Pyle, J. A. Simpson, A. Barnes, and J. D. Mihalov*. **282**, L107, 85-E9 (1984)

The Interplanetary Scattering Mean Free Path: Collisionless Wave-damping Effects. *Joseph M. Davila and John S. Scott*. **285**, 400, 114-C5 (1984)

Very Large Array Observations of Jupiter's Nonthermal Radiation. *Imke de Pater and Walter J. Jaffe*. **54**, 405, 7-C10 (1984) (Abstr. in **277**, 908, 22-A9)

Interstellar Abundances

The High-Ionization and Excited-State Interstellar Lines in the Carina

- Nebula: A Giant H II Region in Absorption. *Nolan R. Walborn, Joy N. Heckathorn, and James E. Hesser.* **276**, 524, 7-C9 (1984)
- Models of Molecular Clouds. I. Multitransition Study of CS. *Ronald L. Snell, Lee G. Mundy, Paul F. Goldsmith, Neal J. Evans II, and Neal R. Erickson.* **276**, 625, 8-D2 (1984)
- A Search for Interstellar H_2O^+ in Diffuse Clouds. *Wm. Hayden Smith, W. V. Schempp, and S. R. Federman.* **277**, 196, 13-B2 (1984)
- Interstellar O_2 . I. Abundance, Excitation, and Prospects for Detection of $^{16}\text{O}^{18}\text{O}$ at Radio Frequencies. *John H. Black and Peter L. Smith.* **277**, 562, 18-B12 (1984)
- High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. *Edward B. Jenkins, George Wallerstein, and Joseph Silk.* **278**, 649, 33-A12 (1984)
- Did the First Metals in Our Galaxy Come from Virgo Cluster Supernovae? *George Wallerstein.* **278**, 663, 33-B12 (1984)
- The Molecular Halo of M82. *Antony A. Stark and Eric R. Carlson.* **279**, 122, 38-C9 (1984)
- Calculations Concerning the $\text{HCO}^+/\text{HOC}^+$ Abundance Ratio in Dense Interstellar Clouds. *D. J. DeFrees, A. D. McLean, and Eric Herbst.* **279**, 322, 40-E3 (1984)
- Interstellar Absorption Lines in the Infrared Spectrum of NGC 2024 IRS 2. *John H. Black and S. P. Willner.* **279**, 673, 45-B14 (1984)
- The Nitrogen-deficient Cluster NGC 6231. *F. P. Keenan, P. J. F. Brown, P. L. Dufton, and D. J. Lennon.* **279**, L11, 42-D12 (1984)
- ^{26}Al in the Interstellar Medium. *Donald D. Clayton.* **280**, 144, 50-E8 (1984)
- Abundance of Interstellar Aluminum. *E. S. Barker, P. M. Lugger, E. J. Weiler, and D. G. York.* **280**, 600, 56-D5 (1984)
- A Search for Interstellar Silicon Nitride. *L. M. Ziurys, D. P. Clemens, R. J. Saykally, M. Colvin, and H. F. Schaefer.* **281**, 219, 63-C9 (1984)
- Interstellar Magnesium Abundances. *M. J. Murray, P. L. Dufton, A. Hibbert, and D. G. York.* **282**, 481, 80-D5 (1984)
- Observations of Narrow Diffuse Interstellar Bands toward Stars with Low Reddening. *S. R. Federman, C. K. Kumar, and P. A. Vanden Bout.* **282**, 485, 80-D9 (1984)
- Cyanide and Isocyanide Abundances in the Cold, Dark Cloud TMC-1. *William M. Irvine and F. Peter Schloerb.* **282**, 516, 80-F12 (1984)
- The Isotopic Composition of the Anomalous Low-Energy Cosmic Rays. *R. A. Mewaldt, J. D. Spalding, and E. C. Stone.* **283**, 450, 91-A3 (1984)
- Interaction of the Outflow and Quiescent Gas in Orion: HCO^+ Aperture Synthesis Maps. *S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch.* **283**, 655, 94-B2 (1984)
- The Correlation of Interstellar Element Depletions with Mean Gas Density. *A. W. Harris, C. Gry, and G. E. Bromage.* **284**, 157, 99-G1 (1984)
- A Reanalysis of the Interstellar CH Abundance. *David J. Lien.* **284**, 578, 105-D5 (1984)
- Interstellar Matter near the Pleiades. I. Optical Absorption-Line Observations and Foreground Atomic Gas. *Richard E. White.* **284**, 685, 106-E2 (1984)
- Interstellar Matter near the Pleiades. II. CH Formation. *Richard E. White.* **284**, 695, 106-E12 (1984)
- Dissociative Recombination Coefficients for H_3^+ , HCO^+ , N_2H^+ , and CH_5^+ at Low Temperature: Interstellar Implications. *D. Smith and N. G. Adams.* **284**, L13, 103-A14 (1984)
- Isotope Shifts of Some Ultraviolet Transitions of First Row Elements. *Charles W. Clark.* **285**, 322, 113-D6 (1984)
- Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. *W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky.* **285**, 801, 120-C1 (1984)
- The Abundance of Interstellar Lithium. *L. M. Hobbs.* **286**, 252, 124-F3 (1984)
- HEAO 3 Discovery of ^{26}Al in the Interstellar Medium. *W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson.* **286**, 578, 129-D14 (1984)
- $^{13}\text{CH}_3\text{OH}$ in OMC-1. *Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia.* **286**, 586, 129-E8 (1984)
- The Detection of Interstellar Methyl-Diacetylene. *Robert B. Loren, Alwyn Wootten, and Lee G. Mundy.* **286**, L23, 126-E11 (1984)
- Interstellar Abundances and Depletions Inferred from Observations of Neutral Atoms. *Theodore P. Snow.* **287**, 238, 135-E2 (1984)
- The Relative Abundances of Cyanogenated Molecules. *E. Churchwell, A. G. Nash, and C. M. Walmsley.* **287**, 681, 141-F9 (1984)
- Nitrogen and Helium Enrichment in Four Wolf-Rayet Ring Nebulae. *Karen B. Kwitter.* **287**, 840, 143-D9 (1984)
- Deuterium Fractionation Mechanisms in Interstellar Clouds. *A. Dalgarno and S. Lepp.* **287**, L47, 138-F5 (1984)
- The Detection of $\text{F}^{14}\text{O}-\text{X}^{12}\text{C}^+$ System of Diatomic Carbon toward X Persei. *David J. Lien.* **287**, L95, 145-F4 (1984)
- Effects of Shocks on the Molecular Composition of a Dense Interstellar Cloud. *George F. Mitchell.* **54**, 81, 2-B12 (1984) (Abstr. in **275**, 928, 147-F1)
- Synthesis of Complex Molecules in Dense Interstellar Clouds via Gas-Phase Chemistry: A Pseudo Time-dependent Calculation. *Chun Ming Leung, Eric Herbst, and Walter F. Huebner.* **56**, 231, 25-D7 (1984) (Abstr. in **284**, 870, 108-E2)
- Optical Interstellar Absorption Lines toward 29 Stars. *L. M. Hobbs.* **56**, 315, 27-B11 (1984) (Abstr. in **285**, 874, 121-A5)
- Interstellar: Grains**
- 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult.* **276**, 533, 7-D4 (1984)
- Ultraviolet Extinction and Diffuse Band Strength Correlations. *C. Gregory Seab and Theodore P. Snow, Jr.* **277**, 200, 13-B6 (1984)
- The Near-Infrared Continuum Emission of Visual Reflection Nebulae. *K. Sellgren.* **277**, 623, 18-G4 (1984)
- The Infrared Signature of Graphite Grains. *B. T. Draine.* **277**, L71, 22-G8 (1984)
- Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. *Paul M. Harvey, Bruce A. Wilking, and Marshall Joy.* **278**, 156, 25-F8 (1984)
- Bipolar Reflection Nebulae: Monte Carlo Simulations. *F. Yusef-Zadeh, Mark Morris, and Richard L. White.* **278**, 186, 26-A11 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga.* **278**, 530, 31-F9 (1984)
- An Infrared Spatial Study of the Planetary Nebula BD +30°3639. *A. F. Bentley, J. A. Hackwell, G. L. Grasdale, and R. D. Gehrz.* **278**, 665, 33-B14 (1984)
- IRAS Observations of the Diffuse Infrared Background. *M. G. Hauser, F. C. Gillett, F. J. Low, T. N. Gautier, C. A. Beichman, G. Neugebauer, H. H. Aumann, B. Baud, N. Boggess, J. P. Emerson, J. R. Houck, B. T. Soifer, and R. G. Walker.* **278**, L15, 29-D4 (1984)
- Ultraviolet Observations of Interstellar Extinction near the Cepheus OB3 Molecular Cloud. *Derck Massa and Blair D. Savage.* **279**, 310, 40-D5 (1984)
- International Ultraviolet Explorer Observations of Stars in 30 Doradus: Extinction and Stellar Continua. *Edward L. Fitzpatrick and Blair D. Savage.* **279**, 578, 44-B10 (1984)
- High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. *John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio.* **279**, 685, 45-C12 (1984)
- Radiatively Driven Dust-bounded Implosion: Formation and Stability of Dense Globules. *Maxwell T. Sandford II, Rodney W. Whitaker, and Richard I. Klein.* **282**, 178, 75-G10 (1984)
- Multiple Circumstellar Shells and Radiation Pressure on Grains in the Outflow from Late-Type Stars. *M. Jura.* **282**, 200, 76-B4 (1984)
- Observations of Narrow Diffuse Interstellar Bands toward Stars with Low Reddening. *S. R. Federman, C. K. Kumar, and P. A. Vanden Bout.* **282**, 485, 80-D9 (1984)
- The Inner Core of a Bok Globule. *Terry Jay Jones, A. R. Hyland, and Jeremy Bailey.* **282**, 675, 82-D5 (1984)
- Observations of Diffuse Interstellar Bands toward T Tauri Stars. *David M. Meyer and Roger K. Ulrich.* **283**, 98, 87-B5 (1984)
- The Dust Content of the Planetary Nebula IC 3568. *Martin Cohen, J. Patrick Harrington, and Rhys Hess.* **283**, 687, 94-D9 (1984)
- Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. III. Numerical Solution and Applications. *C. Rogers and P. G. Martin.* **284**, 327, 101-E6 (1984)
- Optical Properties of Interstellar Graphite and Silicate Grains. *B. T. Draine and Hyung Mok Lee.* **285**, 89, 111-A3 (1984)
- The Complex X-Ray Emission of NGC 253. *G. Fabbiano and G. Trinchieri.* **286**, 491, 128-D14 (1984)
- Extinction in Inhomogeneous Clouds. *A. Natta and N. Panagia.* **287**, 228, 135-D6 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130–200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. *Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira.* **287**, 359, 136-G7 (1984)
- Refractive Indices for Amorphous Carbon. *W. W. Duley.* **287**, 694, 141-G11 (1984)
- Absorption Features in the 5–8 Micron Spectra of Protostars. *A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn.* **287**, 697, 142-A1 (1984)
- Interstellar: Magnetic Fields**
- Upper Limits to Magnetic Fields in C II Regions. *Peter R. Silverglate.* **279**, 694, 45-D7 (1984)
- Magnetic Field Structure in the Taurus Dark Cloud. *Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L.*

Interstellar: Magnetic Fields—Continued

- Perry. **282**, 508, 80-F4 (1984)
- Double Faraday Rotation toward 3C 27. S. J. Goldstein, Jr. and J. A. Reed. **283**, 540, 92-F9 (1984)
- Small-Scale Variation in the Galactic Magnetic Field: The Rotation Measure Structure Function and Birefringence in Interstellar Scintillations. J. H. Simonetti, J. M. Cordes, and S. R. Spangler. **284**, 126, 99-D9 (1984)
- The Role of the Galactic Magnetic Field in the Evolution of a Dark Globular Filament in Cygnus. David McDavid. **284**, 141, 99-E10 (1984)
- On "The Ambipolar Diffusion Time Scale and the Location of Star Formation in Magnetic Interstellar Clouds": Setting the Record Straight. Telemachos Ch. Mouschovias. **285**, 124, 111-C10 (1984)
- Interstellar: Matter**
- Interstellar Lines in Spectra of Extragalactic Sources. III. Markarian 509, Arakelian 120, and 3C 273. D. G. York, S. Ratcliff, J. C. Blades, L. L. Cowie, D. C. Morton, and C. C. Wu. **276**, 92, 2-A1 (1984)
- Two-Fluid Gravitational Instabilities in a Galactic Disk. Chanda J. Jog and P. M. Solomon. **276**, 114, 2-B9 (1984)
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. Chanda J. Jog and P. M. Solomon. **276**, 127, 2-C8 (1984)
- Giant Molecular Clouds in the Galaxy. I. The Axisymmetric Distribution of H_2 . D. B. Sanders, P. M. Solomon, and N. Z. Scoville. **276**, 182, 2-G7 (1984)
- On the Photoproduction of Triply Ionized Carbon and Silicon in the Galactic Halo. T. W. Hartquist, M. Pettini, and A. Tarrant. **276**, 519, 7-C4 (1984)
- Far-Infrared Spectroscopy of the Galactic Center: Neutral and Ionized Gas in the Central 10 Parsecs of the Galaxy. R. Genzel, Dan M. Watson, C. H. Townes, H. L. Dinerstein, D. Hollenbach, D. F. Lester, M. Werner, and J. W. V. Storey. **276**, 551, 7-E9 (1984)
- A High-Resolution Study of Herbig-Haro Objects 1 and 2. L. Hartmann and J. C. Raymond. **276**, 560, 7-F4 (1984)
- 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccauro. **277**, 43, 11-D6 (1984)
- Ultraviolet Extinction and Diffuse Band Strength Correlations. C. Gregory Seb and Theodore P. Snow, Jr. **277**, 200, 13-B6 (1984)
- Turbulent Velocity Structure in Interstellar Clouds. John M. Scalo. **277**, 556, 18-B6 (1984)
- Carbon and Oxygen Isotope Fractionation in Dense Interstellar Clouds. William D. Langer, T. E. Graedel, Margaret A. Frerking, and P. B. Armentrout. **277**, 581, 18-D4 (1984)
- On the Dynamics in Evaporating Cloud Envelopes. John L. Giuliani, Jr. **277**, 605, 18-E14 (1984)
- XUV Observations of Capella and the Local Interstellar Medium. Norman Bobroff, John Nousek, and Gordon Garmire. **277**, 678, 19-E3 (1984)
- Diffuse Galactic and Extragalactic Radiation in the Far-Infrared. P. de Bernardis, S. Masi, B. Melchiorri, F. Melchiorri, and G. Moreno. **278**, 150, 25-F2 (1984)
- Absolute Spectrophotometry of Wolf-Rayet Stars from 1200 to 7000 Å: A Cautionary Tale. Catharine D. Garmann, Philip Massey, and Peter S. Conti. **278**, 233, 26-E3 (1984)
- Massive Star Formation in NGC 6946. K. DeGioia-Eastwood, G. L. Grasdale, S. E. Strom, and K. M. Strom. **278**, 564, 32-B1 (1984)
- High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. Edward B. Jenkins, George Wallerstein, and Joseph Silk. **278**, 649, 33-A12 (1984)
- Interstellar Polarization, Grain Growth, and Alignment: Erratum. Per A. Aarnestad and J. Mayo Greenberg. **278**, 893, 35-E11 (1984) (Orig. paper in **272**, 551, 107-G6)
- Infrared Cirrus: New Components of the Extended Infrared Mission. F. J. Low, D. A. Beintema, T. N. Gautier, F. C. Gillett, C. A. Beichman, G. Neugebauer, E. Young, H. H. Aumann, N. Boggess, J. P. Emerson, H. J. Habing, M. G. Hauser, J. R. Houck, M. Rowan-Robinson, B. T. Soifer, R. G. Walker, and P. R. Wesselius. **278**, L19, 29-D8 (1984)
- Evidence for High-Velocity Inflow of Neutral Hydrogen toward the Galaxy. I. F. Mirabel and R. Morris. **279**, 86, 38-A2 (1984)
- The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. J. B. G. M. Bloemen, L. Blitz, and W. Hermsen. **279**, 136, 38-D9 (1984)
- Clump Collisions in Molecular Clouds: Gravitational Instability and Coalescence. David L. Gilden. **279**, 335, 40-F2 (1984)
- Observations of Infrared Hydrogen Recombination Line Emission from External Galaxies. S. C. Beck, S. Beckwith, and Ian Gatley. **279**, 563, 44-A9 (1984)
- International Ultraviolet Explorer Observations of Stars in 30 Doradus:

- Extinction and Stellar Continua. Edward L. Fitzpatrick and Blair D. Savage. **279**, 578, 44-B10 (1984)
- Interstellar Absorption Lines in the Infrared Spectrum of NGC 2024 IRS 2. John H. Black and S. P. Willner. **279**, 673, 45-B14 (1984)
- The Variation of Galactic Interstellar Extinction in the Ultraviolet. A. N. Witt, R. C. Bohlin, and T. P. Stecher. **279**, 698, 45-D11 (1984)
- The Bremsstrahlung Component of the Diffuse Galactic Gamma-Ray Emission at MeV Energies. W. Sacher and V. Schönfelder. **279**, 817, 46-F7 (1984)
- The Nitrogen-deficient Cluster NGC 6231. F. P. Keenan, P. J. F. Brown, P. L. Dufton, and D. J. Lennon. **279**, L11, 42-D12 (1984)
- Dense Cores in Dark Clouds: Young Embedded Stars at 2 Micrometers. P. J. Benson, P. C. Myers, and E. L. Wright. **279**, L27, 42-E13 (1984)
- Why Do Few High-Redshift QSO Narrow-Line Absorption Systems Exhibit Mixed Ionization Spectra? T. W. Hartquist and J. E. Dyson. **279**, L35, 48-A5 (1984)
- A Cosmic-Ray Supported Galactic Corona. Roger A. Chevalier and Claes Fransson. **279**, L43, 48-A12 (1984)
- A Successful Survey of H I in Low-Luminosity Elliptical Galaxies. George Lake and R. A. Schommer. **280**, 107, 50-B12 (1984)
- On Absorption by Hot Interstellar Gas. I. [Fe x] λ 6375. L. M. Hobbs. **280**, 132, 50-D10 (1984)
- The Spatial Extent of the 3.3 Micron Emission Feature in the Seyfert Galaxy NGC 7469. Roc M. Cutri, Richard J. Rudy, G. H. Rieke, Alan T. Tokunaga, and S. P. Willner. **280**, 521, 55-E6 (1984)
- Infall in Elliptical Galaxies. Raymond E. White III and Roger A. Chevalier. **280**, 561, 56-A6 (1984)
- The Path-Length Distribution for Galactic Cosmic-Ray Propagation: An Energy-Dependent Depletion of Short Path Lengths. M. Garcia-Munoz, T. G. Guzik, J. A. Simpson, and J. P. Wefel. **280**, L13, 54-D4 (1984)
- Spectroscopy of the Nebulosity around Eight High-Luminosity QSOs. Todd A. Borason and J. B. Oke. **281**, 535, 68-D5 (1984)
- Imaging Spectrophotometric Observations of the Ionized Hydrogen Associated with M82. T. B. Williams, Nelson Caldwell, and R. A. Schommer. **281**, 579, 68-G7 (1984)
- Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York. **281**, 585, 69-A5 (1984)
- Kinematics of Molecular Clouds. I. Velocity Dispersion in the Solar Neighborhood. Antony A. Stark. **281**, 624, 69-D2 (1984)
- On Absorption by Hot Interstellar Gas. II. [Fe xiv] λ 5303. L. M. Hobbs and C. E. Albert. **281**, 639, 69-E3 (1984)
- Thermal Evaporation of Spherical Clouds: Effects of Viscous Stresses. B. T. Draine and J. L. Giuliani, Jr. **281**, 690, 70-A13 (1984)
- A Galactic Disk is Not a True Exponential. Philip E. Seiden, Lawrence S. Schulman, and Bruce G. Elmegreen. **282**, 95, 75-A7 (1984)
- Spiral Structure and Star Formation. II. Stellar Lifetimes and Cloud Kinematics. Mark A. Hausman and William W. Roberts, Jr. **282**, 106, 75-B4 (1984)
- A Measurement of the Hydrogen Recombination Rate in the Diffuse Interstellar Medium. R. J. Reynolds. **282**, 191, 76-A9 (1984)
- Detection of U45379: An Intense, Peculiar Unidentified Line. H. Suzuki, N. Kaiju, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito. **282**, 197, 76-B1 (1984)
- Ultraviolet Interstellar Absorption toward Stars in the Small Magellanic Cloud. II. Sk 159. Edward L. Fitzpatrick. **282**, 436, 80-A1 (1984)
- Interstellar Magnesium Abundances. M. J. Murray, P. L. Dufton, A. Hibbert, and D. G. York. **282**, 481, 80-D5 (1984)
- Observations of Narrow Diffuse Interstellar Bands toward Stars with Low Reddening. S. R. Federman, C. K. Kumar, and P. A. Vanden Bout. **282**, 485, 80-D9 (1984)
- Limits on the Infrared and Visual Luminosity of the Intergalactic H I Cloud in Leo. M. F. Skrutskie, M. A. Shure, and S. Beckwith. **282**, L65, 85-B13 (1984)
- Ammonia Absorption toward NGC 7538 IRS 1: 2 Arc Second Observations in the (3,3) Line. C. Henkel, T. L. Wilson, and K. J. Johnston. **282**, L93, 85-D10 (1984)
- Observations of Diffuse Interstellar Bands toward T Tauri Stars. David M. Meyer and Roger K. Ulrich. **283**, 98, 87-B5 (1984)
- The Ratio of Total to Selective Extinction in the Chamaeleon T1 and R Coronae Australis Dark Clouds. F. J. Vrba and A. E. Rydgren. **283**, 123, 87-D2 (1984)
- Scattering of Shock Waves by a Spherical Cloud. Satoru Ikeuchi and Lyman Spitzer, Jr. **283**, 825, 96-A1 (1984)
- The Distribution of CO in the Galaxy for Longitudes 294° to 86°. B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon. **283**, L31, 97-A8 (1984)

- On the Interpretation of the Broad-Band Millimeter-Wave Flux from Orion. *E. C. Sutton, Geoffrey A. Blake, C. R. Masson, and T. G. Phillips.* **283**, L41, 97-B4 (1984)
- The Role of the Galactic Magnetic Field in the Evolution of a Dark Globular Filament in Cygnus. *David McDavid.* **284**, 141, 99-E10 (1984)
- Optically Thick Ablation Fronts. *Arieh Königl.* **284**, 303, 101-C10 (1984)
- Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga.* **284**, 523, 104-G5 (1984)
- Interstellar Matter near the Pleiades. I. Optical Absorption-Line Observations and Foreground Atomic Gas. *Richard E. White.* **284**, 685, 106-E2 (1984)
- The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. *S. A. Drake, A. Brown, and J. L. Linsky.* **284**, 774, 107-D10 (1984)
- On Interstellar [Fe X] Absorption toward Cepheus OB2. *L. M. Hobbs.* **284**, L47, 109-C3 (1984)
- Detection of Submillimeter Polarization in the Orion Nebula. *R. H. Hildebrand, M. Dragovan, and G. Novak.* **284**, L51, 109-C7 (1984)
- Density Fluctuations in the Interstellar Medium: Evidence for Anisotropic Magnetogasdynamical Turbulence. I. Model and Astrophysical Sites. *J. C. Higdon.* **285**, 109, 111-B9 (1984)
- On "The Ambipolar Diffusion Time Scale and the Location of Star Formation in Magnetic Interstellar Clouds": Setting the Record Straight. *Telemachos Ch. Mouschovias.* **285**, 124, 111-C10 (1984)
- Face-on Galaxies. *B. M. Lewis.* **285**, 453, 116-D5 (1984)
- Extended Gaseous Emission in Normal Elliptical Galaxies. *M.-H. Demoulin-Ulrich, H. R. Butcher, and A. Boksenberg.* **285**, 527, 117-C4 (1984)
- Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. *W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky.* **285**, 801, 120-C1 (1984)
- HEAO 3 Discovery of ^{26}Al in the Interstellar Medium. *W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson.* **286**, 578, 129-D14 (1984)
- Limits on Diffuse X-Ray Emission from M101. *D. McCammon and W. T. Sanders.* **287**, 167, 134-F13 (1984)
- The Heating of Cloud-Hot Phase Interface Regions by the Dissipation of Hydromagnetic Waves. *T. W. Hartquist and G. E. Morfill.* **287**, 194, 135-A13 (1984)
- Limits on Soft X-Ray Flux from Distant Emission Regions. *D. N. Burrows, D. McCammon, W. T. Sanders, and W. L. Kraushaar.* **287**, 208, 135-B13 (1984)
- Extinction in Inhomogeneous Clouds. *A. Natta and N. Panagia.* **287**, 228, 135-D6 (1984)
- Ultraviolet Radiation from White Dwarfs and the Carbon Ionization in the Galactic Halo. *Nino Panagia and Yervant Terzian.* **287**, 315, 136-D5 (1984)
- Reevaluation of the Rate Constants for the Reactions $\text{C}^+ + \text{H}_2 \rightarrow \text{CH}^+ + \text{H}$ and $\text{CH}^+ + \text{H} \rightarrow \text{C}^+ + \text{H}_2$ at Temperatures Characteristic of Ambient and Shocked Diffuse Interstellar Clouds. *Walter J. Chesnavich, Victor E. Akin, and Douglas A. Webb.* **287**, 676, 141-F3 (1984)
- Refractive Indices for Amorphous Carbon. *W. W. Duley.* **287**, 694, 141-G11 (1984)
- K Giants and the Total Amount of Matter near the Sun. *John N. Bahcall.* **287**, 926, 144-C13 (1984)
- Infrared Spectrum of the Laboratory-Synthesized Quenched Carbonaceous Composite (QCC): Comparison with the Infrared Unidentified Emission Bands. *Akira Sakata, Setsuko Wada, Toshihiko Tanabé, and Takashi Onaka.* **287**, L51, 138-F9 (1984)
- Reddening Estimates for Galaxies in the Second Reference Catalog and the Uppsala General Catalog. *David Burstein and Carl Heiles.* **54**, 33, 1-C4 (1984) (Abstr. in **275**, 927, 147-E14)
- A Survey of the Latitude Structure of Galactic H I on Small Angular Scales. *T. M. Bania and Felix J. Lockman.* **54**, 513, 8-F9 (1984) (Abstr. in **278**, 895, 35-E13)
- Optical Interstellar Absorption Lines toward 29 Stars. *L. M. Hobbs.* **56**, 315, 27-B11 (1984) (Abstr. in **285**, 874, 121-A5)
- Interstellar: Molecules**
- A Galactic Disk as a Two-Fluid System: Consequences for the Critical Stellar Velocity Dispersion and the Formation of Condensations in the Gas. *Chanda J. Jog and P. M. Solomon.* **276**, 127, 2-C8 (1984)
- Giant Molecular Clouds in the Galaxy. I. The Axisymmetric Distribution of H_2 . *D. B. Sanders, P. M. Solomon, and N. Z. Scoville.* **276**, 182, 2-G7 (1984)
- The Star-forming Region in Cepheus A. *V. A. Hughes and J. G. A. Wouterloot.* **276**, 204, 3-B2 (1984)
- Methyl Acetylene as a Temperature Probe for Dense Interstellar Clouds. *T. B. H. Kuiper, E. N. Rodriguez Kuiper, Dale F. Dickinson, B. E. Turner, and B. Zuckerman.* **276**, 211, 3-B9 (1984)
- Infrared and Far-Infrared Transition Frequencies for the CH_2 Radical. *Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown.* **276**, 399, 5-B7 (1984)
- CO Emission from the Star-Burst Irregular Galaxy NGC 1569. *Judith S. Young, J. S. Gallagher, and Deidre A. Hunter.* **276**, 476, 6-F13 (1984)
- 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult.* **276**, 533, 7-D4 (1984)
- Models of Molecular Clouds. I. Multitransition Study of CS. *Ronald L. Snell, Lee G. Mundy, Paul F. Goldsmith, Neal J. Evans II, and Neal R. Erickson.* **276**, 625, 8-D2 (1984)
- The Microwave Background Temperature at 2.64 and 1.32 Millimeters. *David M. Meyer and Michael Jura.* **276**, L1, 5-E2 (1984)
- The Detection of Interstellar Methylcyanoacetylene. *N. W. Broten, J. M. MacLeod, L. W. Avery, William M. Irvine, B. Höglund, P. Friberg, and A. Hjalmarsen.* **276**, L25, 5-F14 (1984)
- Formaldehyde in the Orion Molecular Flow: Evidence for a Gentle Acceleration. *Alwyn Wootten, Robert B. Loren, and J. Bally.* **277**, 189, 13-A9 (1984)
- A Search for Interstellar H_2O^+ in Diffuse Clouds. *Wm. Hayden Smith, W. V. Schempp, and S. R. Federman.* **277**, 196, 13-B2 (1984)
- Ultraviolet Extinction and Diffuse Band Strength Correlations. *C. Gregory Seab and Theodore P. Snow, Jr.* **277**, 200, 13-B6 (1984)
- Turbulent Velocity Structure in Interstellar Clouds. *John M. Scalo.* **277**, 556, 18-B6 (1984)
- Interstellar O_2 . I. Abundance, Excitation, and Prospects for Detection of $^{16}\text{O}^{18}\text{O}$ at Radio Frequencies. *John H. Black and Peter L. Smith.* **277**, 562, 18-B12 (1984)
- Interstellar O_2 . II. VUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. *Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman.* **277**, 569, 18-C5 (1984)
- Photodissociation of OH in Interstellar Clouds. *Ewine F. van Dishoeck and A. Dalgarno.* **277**, 576, 18-C12 (1984)
- Carbon and Oxygen Isotope Fractionation in Dense Interstellar Clouds. *William D. Langer, T. E. Graedel, Margaret A. Frerking, and P. B. Armentrout.* **277**, 581, 18-D4 (1984)
- Interactions between Pre-Main-Sequence Objects and Molecular Clouds. II. PV Cephei. *Russell M. Levreault.* **277**, 634, 19-A6 (1984)
- Star Formation in the M8E Region. *M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders.* **278**, 170, 25-G8 (1984)
- Observations and Analysis of Circumstellar Cyanoacetylene. *P. R. Jewell and L. E. Snyder.* **278**, 176, 26-A1 (1984)
- The Molecular Halo of M82. *Antony A. Stark and Eric R. Carlson.* **279**, 122, 38-C9 (1984)
- Optical H II Regions in the Outer Galaxy. *Michel Fich and Leo Blitz.* **279**, 125, 38-C12 (1984)
- The Radial Distribution of Galactic Gamma-Rays. I. Emissivity and Extent in the Outer Galaxy. *J. B. G. M. Bloemen, L. Blitz, and W. Hermsen.* **279**, 136, 38-D9 (1984)
- Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. *S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley.* **279**, 162, 38-F11 (1984)
- The Formation of Massive Stars along the W5 Ionization Front. *B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering.* **279**, 291, 40-B12 (1984)
- Ultraviolet Observations of Interstellar Extinction near the Cepheus OB3 Molecular Cloud. *Derck Massa and Blair D. Savage.* **279**, 310, 40-D5 (1984)
- Calculations Concerning the $\text{HCO}^+/\text{HOC}^+$ Abundance Ratio in Dense Interstellar Clouds. *D. J. DeFrees, A. D. McLean, and Eric Herbst.* **279**, 322, 40-E3 (1984)
- VLA Observations of 1612 and 1667 MHz OH Masers Associated with IRC +10420. *P. F. Bowers.* **279**, 350, 40-G3 (1984)
- The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO^+ Flow in NGC 2071. *Alwyn Wootten, Robert B. Loren, Aage Sandqvist, Per Friberg, and Åke Hjalmarsen.* **279**, 633, 44-F14 (1984)
- Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. *Bel Campbell and Rodger I. Thompson.* **279**, 650, 45-A5 (1984)
- The Molecular Cloud Associated with the Infrared Source GL 437. *Richard Arquilla and Paul F. Goldsmith.* **279**, 664, 45-B5 (1984)
- Interstellar Absorption Lines in the Infrared Spectrum of NGC 2024 IRS 2. *John H. Black and S. P. Willner.* **279**, 673, 45-B14 (1984)
- Silane in IRC +10216. *D. M. Goldhaber and A. L. Betz.* **279**, L55,

Interstellar Molecules—Continued

- 48-B12 (1984)
- The Chemistry of Phosphorus in Dense Interstellar Clouds. *L. R. Thorne, V. G. Anicich, S. S. Prasad, and W. T. Huntress, Jr.* **280**, 139, 50-E3 (1984)
- NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein.* **280**, 154, 50-F5 (1984)
- Molecules in the Early Universe. *Stephen Lepp and Michael Shull.* **280**, 465, 55-A5 (1984)
- HNCO in Molecular Clouds. *James M. Jackson, J. Thomas Armstrong, and Alan H. Barrett.* **280**, 608, 56-D13 (1984)
- H₂O in W49N. II. Statistical Studies of Hyperfine Structure, Clustering, and Velocity Distributions. *R. C. Walker.* **280**, 618, 56-E10 (1984)
- The Structure of High-Velocity Gas in Orion and the Possible Role of IRC9. *S. C. Beck.* **281**, 205, 63-B9 (1984)
- The Cyanopolynes as a Chemical Clock for Molecular Clouds. *Steven W. Stahler.* **281**, 209, 63-B13 (1984)
- A Search for Interstellar Silicon Nitride. *L. M. Ziurys, D. P. Clemens, R. J. Saykally, M. Colvin, and H. F. Schaefer.* **281**, 219, 63-C9 (1984)
- Far-Infrared Selected Star Formation Regions. *D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran.* **281**, 225, 63-D1 (1984)
- A Survey of High-Velocity Molecular Gas near Herbig-Haro Objects. II. *Suzan Edwards and Ronald L. Snell.* **281**, 237, 63-D13 (1984)
- Kinematics of Molecular Clouds. I. Velocity Dispersion in the Solar Neighborhood. *Antony A. Stark.* **281**, 624, 69-D2 (1984)
- Nearby Molecular Clouds. I. Ophiuchus-Sagittarius, $b > 10^\circ$. *F. Lebrun and Y.-L. Huang.* **281**, 634, 69-D12 (1984)
- An Aperture Synthesis Map of HCN Emission Close to W3 IRS 4. *Melvyn C. H. Wright, Helene R. Dickel, and Paul T. P. Ho.* **281**, L71, 73-B6 (1984)
- Photodissociation Rates of Molecules by the Interstellar Radiation Field. *Long C. Lee.* **282**, 172, 75-G4 (1984)
- Observations of Narrow Diffuse Interstellar Bands toward Stars with Low Reddening. *S. R. Federman, C. K. Kumar, and P. A. Vanden Bout.* **282**, 485, 80-D9 (1984)
- CO Line Emission from Shock Waves in Molecular Clouds. *B. T. Draine and W. G. Roberge.* **282**, 491, 80-E1 (1984)
- Cyanide and Isocyanide Abundances in the Cold, Dark Cloud TMC-1. *William M. Irvine and F. Peter Schloerb.* **282**, 516, 80-F12 (1984)
- High-Latitude Molecular Clouds. *Leo Blitz, Loris Magnani, and Lee Mundy.* **282**, L9, 78-A9 (1984)
- Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. *K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody.* **282**, L59, 85-B4 (1984)
- High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? *T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. *R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto.* **282**, L73, 85-C6 (1984)
- High Spatial Resolution Observations of Orion Bright Bar: CS ($J = 1-0$) and H51 α Emission. *T. Omodaka, M. Hayashi, and T. Hasegawa.* **282**, L77, 85-C9 (1984)
- The $v = 0 \rightarrow 0$ Spectrum of H₂. *D. E. Jennings, S. L. Bragg, and J. W. Braut.* **282**, L85, 85-D2 (1984)
- The Detection of Interstellar Methylidyne (CH). *J. M. MacLeod, L. W. Avery, and N. W. Broten.* **282**, L89, 85-D5 (1984)
- Ammonia Absorption toward NGC 7538 IRS 1: 2 Arc Second Observations in the (3,3) Line. *C. Henkel, T. L. Wilson, and K. J. Johnston.* **282**, L93, 85-D10 (1984)
- On the Correlation of CO Line and Radio Continuum Emission in Nearby Galaxies and the Efficiency of OB Star Formation. *F. P. Israel and M. Rowan-Robinson.* **283**, 81, 87-A2 (1984)
- 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. *T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann.* **283**, 106, 87-B13 (1984)
- CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichi Morita, Arata Tojo, and Kenji Akabane.* **283**, 117, 87-C10 (1984)
- Large-Scale Structure of Molecular Gas in Heiles Cloud 2: A Remarkable Rotating Ring. *F. Peter Schloerb and Ronald L. Snell.* **283**, 129, 87-D8 (1984)
- Structure of the L1535 Dark Cloud and the Velocity Field in the Taurus Molecular Complex. *Paul F. Goldsmith and Michael F. Sernyak, Jr.* **283**, 140, 87-E7 (1984)
- SiO Flux Measurements of Variable Stars. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson.* **283**, 174, 88-A2 (1984)
- Far-Infrared and CO Observations of the W33 Complex. *M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino.* **283**, 573, 93-B4 (1984)
- A Low Density Molecular Cloud in the Vicinity of the Pleiades. *S. R. Federman and Robert F. Willson.* **283**, 626, 93-F14 (1984)
- Interaction of the Outflow and Quiescent Gas in Orion: HCO⁺ Aperture Synthesis Maps. *S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch.* **283**, 655, 94-B2 (1984)
- CN in Dark Interstellar Clouds. *Richard M. Crutcher, Ed Churchwell, and L. M. Ziurys.* **283**, 668, 94-C4 (1984)
- Thermal Instability in Molecular Clouds. *David L. Gilden.* **283**, 679, 94-D1 (1984)
- The Distribution of CO in the Galaxy for Longitudes 294° to 86° . *B. J. Robinson, R. N. Manchester, J. B. Whiteoak, D. B. Sanders, N. Z. Scoville, D. P. Clemens, W. H. McCutcheon, and P. M. Solomon.* **283**, L31, 97-A8 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. *C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody.* **283**, L37, 97-A14 (1984)
- Identification of the SiCC Radical toward IRC +10216: The First Molecular Ring in an Astronomical Source. *P. Thaddeus, S. E. Cummins, and R. A. Linke.* **283**, L45, 97-B8 (1984)
- A Search for High-Velocity Carbon Monosulfide Emission in Star-Forming Regions. *Harley A. Thronson, Jr. and Charles J. Lada.* **284**, 135, 99-E4 (1984)
- SIS in Circumstellar Shells. *R. Sahai, Alwyn Wootten, and R. E. S. Clegg.* **284**, 144, 99-F2 (1984)
- Infrared and Millimeter-Wave Observations of the Sharpless 156 Molecular Cloud. *Marshall Joy, Neal J. Evans II, Paul M. Harvey, and Bruce A. Wilking.* **284**, 161, 99-G5 (1984)
- High-Velocity Molecular Jets. *Ronald L. Snell, N. Z. Scoville, D. B. Sanders, and Neal R. Erickson.* **284**, 176, 100-A8 (1984)
- A Reanalysis of the Interstellar CH Abundance. *David J. Lien.* **284**, 578, 105-D5 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper.* **284**, 597, 105-E12 (1984)
- Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. *D. T. Jaffe, J. A. Davidson, M. Dragovan, and R. H. Hildebrand.* **284**, 637, 106-A10 (1984)
- Interstellar Matter near the Pleiades. I. Optical Absorption-Line Observations and Foreground Atomic Gas. *Richard E. White.* **284**, 685, 106-E2 (1984)
- Interstellar Matter near the Pleiades. II. CH Formation. *Richard E. White.* **284**, 695, 106-E12 (1984)
- Dissociative Recombination Coefficients for H₂⁺, HCO⁺, N₂H⁺, and CH₂⁺ at Low Temperature: Interstellar Implications. *D. Smith and N. G. Adams.* **284**, L13, 103-A14 (1984)
- Can the Ballistic Particle Model Explain the Hubble Sequence? *David Leisawitz and Frank Bash.* **285**, 25, 110-C2 (1984)
- Linear Polarization of Molecular Lines at Radio Frequencies. *Shuji Deguchi and William D. Watson.* **285**, 126, 111-C12 (1984)
- The Formation and Early Dynamical Evolution of Bound Stellar Systems. *Charles J. Lada, Michael Margulis, and David Dearborn.* **285**, 141, 111-D14 (1984)
- On the Excitation of CH Microwave Lines. *V. Bujarrabal, I. Gonzalo, and F. Salinas.* **285**, 312, 113-C10 (1984)
- Theoretical Reinvestigation of Hydrocarbon and Cyanoacetylene Abundances in TMC-1. *Eric Herbst, Nigel G. Adams, and David Smith.* **285**, 618, 118-C7 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. *M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody.* **285**, L79, 121-G2 (1984)
- 2₁₁-2₁₂ Formaldehyde Emission from DR 21(OH). *K. J. Johnston, C. Henkel, and T. L. Wilson.* **285**, L85, 121-G7 (1984)
- The Methyl Cyanide Hot and Warm Cores in Orion: Statistical Equilibrium Excitation Models of a Symmetric-Top Molecule. *Robert B. Loren and Lee G. Mundy.* **286**, 232, 124-D10 (1984)
- Large-Scale Structure of the Taurus Molecular Complex. I. Density Fluctuations—A Fossil Jeans Length? *S. C. Kleiner and R. L. Dickman.* **286**, 255, 124-F6 (1984)
- Thermal and Maser Molecular Lines from the Envelope of IRC +10216.

- Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner. **286**, 276, 125-A1 (1984)
- ¹³CH₃OH in OMC-1. Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T. G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia. **286**, 586, 129-E8 (1984)
- The Molecular Disk in S106. J. H. Bieging. **286**, 591, 129-E13 (1984)
- Bipolar Outflows in Dark Clouds. Paul F. Goldsmith, Ronald L. Snell, Mark Hemeon-Heyer, and William D. Langer. **286**, 599, 129-F7 (1984)
- The Detection of Interstellar Methyl-Diacetylene. Robert B. Loren, Alwyn Wootten, and Lee G. Mundy. **286**, L23, 126-E11 (1984)
- Low-Temperature Dissociative Recombination of $e + H_3^+$. H. H. Michels and R. H. Hobbs. **286**, L27, 126-F1 (1984)
- Molecular Clouds in M82. Judith S. Young and N. Z. Scoville. **287**, 153, 134-E12 (1984)
- Star Cloud Turbulence. R. N. Henriksen and B. E. Turner. **287**, 200, 135-B5 (1984)
- The CN Radical in Diffuse Interstellar Clouds. S. R. Federman, A. C. Danks, and D. L. Lambert. **287**, 219, 135-C11 (1984)
- Effects of Shocks on the Sulfur Chemistry of a Dense Interstellar Cloud. George F. Mitchell. **287**, 665, 141-E6 (1984)
- An Estimate of Star Formation Efficiency in Molecular Clouds. T. N. Rengarajan. **287**, 671, 141-E12 (1984)
- The Relative Abundances of Cyanogenated Molecules. E. Churchwell, A. G. Nash, and C. M. Walmsley. **287**, 681, 141-F9 (1984)
- Refractive Indices for Amorphous Carbon. W. W. Duley. **287**, 694, 141-G11 (1984)
- Absorption Features in the 5-8 Micron Spectra of Protostars. A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn. **287**, 697, 142-A1 (1984)
- High-Velocity HCO⁺ in Cepheus A: Ionization Levels in High-Density Clumps within a Molecular Flow. Robert B. Loren, Alwyn Wootten, Aa. Sandqvist, P. Friberg, and A. Hjalmarsen. **287**, 707, 142-A11 (1984)
- The Gas Density Gradient for Three Dark Interstellar Clouds. Stuart A. Fulkerson and Frank O. Clark. **287**, 723, 142-B14 (1984)
- Deuterium Fractionation Mechanisms in Interstellar Clouds. A. Dalgarno and S. Lepp. **287**, L47, 138-F5 (1984)
- CO Emission from IRAS Galaxies. Judith S. Young, Jeffrey Kenney, Steven D. Lord, and F. Peter Schloerb. **287**, L65, 145-C14 (1984)
- The Detection of F¹Π_g-X¹Σ_g⁺ System of Diatomic Carbon toward X Persei. David J. Lien. **287**, L95, 145-F4 (1984)
- Effects of Shocks on the Molecular Composition of a Dense Interstellar Cloud. George F. Mitchell. **54**, 81, 2-B12 (1984) (Abstr. in **275**, 928, 147-F1)
- Synthesis of Complex Molecules in Dense Interstellar Clouds via Gas-Phase Chemistry: A Pseudo Time-dependent Calculation. Chun Ming Leung, Eric Herbst, and Walter F. Huebner. **56**, 231, 25-D7 (1984) (Abstr. in **284**, 870, 108-E2)
- Ionization: see Atomic Processes**
- Laboratory Spectra**
- Infrared and Far-Infrared Transition Frequencies for the CH₂ Radical. Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown. **276**, 399, 5-B7 (1984)
- Laboratory Measurements of the Millimeter-Wave Spectrum of Magnesium Monoxide. T. C. Steimle, Y. Azuma, and P. G. Carrick. **277**, L21, 16-B6 (1984)
- Laboratory Identification of the 3s²3p² ³P_{2,1}-3s3p³ ⁵S₂^o Intersystem Lines of S III. Peter L. Smith, Carl Erik Magnusson, and Per Olof Zetterberg. **277**, L79, 23-A5 (1984)
- The Direct Measurement of the 3³P₀-3³P₁ Fine-Structure Interval and the g_F-Factor of Atomic Silicon by Laser Magnetic Resonance. Massimo Inguscio, K. M. Evenson, Virgilio Beltran-Lopez, and Eugenio Ley-Koo. **278**, L127, 36-D9 (1984)
- Laboratory Millimeter-Wave Spectrum of Iron Monoxide, FeO. Yasuki Endo, Shuji Saito, and Eizi Hirota. **278**, L131, 36-D13 (1984)
- Collisional Excitation Rate Coefficients for Fe XI. Jieh-Shan Wang, Ariy Marotta, and Raju-U. Datta. **279**, 460, 42-A8 (1984)
- Electron Density-Dependent Intensity Ratios of Highly Ionized Iron Lines: A Comparison of Theory and Experiment. B. C. Stratton, H. W. Moos, and M. Finkenthal. **279**, L31, 42-F3 (1984)
- The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. S. J. Daunt, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault. **280**, 921, 59-G9 (1984)
- The Radiative Lifetime of the ⁵S₂^o Metastable Level of O⁺. B. Carol Johnson, Peter L. Smith, and R. D. Knight. **281**, 477, 65-B6 (1984)
- Laboratory Submillimeter Transition Frequencies of ⁷LiH and ⁶LiH. Grant M. Plummer, Eric Herbst, and Frank C. De Lucia. **282**, L113, 85-F1 (1984)
- Refractive Indices for Amorphous Carbon. W. W. Duley. **287**, 694, 141-G11 (1984)
- Infrared Spectrum of the Laboratory-Synthesized Quenched Carbonaceous Composite (QCC): Comparison with the Infrared Unidentified Emission Bands. Akira Sakata, Setsuko Wada, Toshihiko Tanabé, and Takashi Onaka. **287**, L51, 138-F9 (1984)
- Laboratory Millimeter and Submillimeter Spectra of HNO and DNO. K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- The Millimeter and Submillimeter Laboratory Spectrum of Methyl Formate in its Ground Symmetric Torsional State. Grant M. Plummer, Eric Herbst, Frank C. De Lucia, and Geoffrey A. Blake. **55**, 633, 20-C10 (1984) (Abstr. in **282**, 821, 84-A11)
- Line Formation**
- Transfer of Resonance Line Radiation in the Comoving Frame of an Expanding Cylinder. Paul B. Kunasz. **276**, 677, 9-A1 (1984)
- Observations of Three QSOs with Complex, Broad Absorption Lines. D. A. Turnshek, R. J. Weymann, R. F. Carswell, and M. G. Smith. **277**, 51, 11-E1 (1984)
- Observational Tests of X-Ray Heating in the Broad-Line Region of Quasars and Seyfert Galaxies. Gerard A. Kriss. **277**, 495, 17-D13 (1984)
- New Results on the Formation of Broad Emission Lines in QSOs. David A. Turnshek. **278**, L87, 36-A4 (1984)
- Lyman and Balmer Continuum Ionization in Zero-Age Main-Sequence Stars: Applications to the Line Excess Phenomenon. Rodger I. Thompson. **283**, 165, 87-G7 (1984)
- Instabilities in Line-driven Stellar Winds. I. Dependence on Perturbation Wavelength. S. P. Owocki and G. B. Rybicki. **284**, 337, 101-F2 (1984)
- Consequences of a Chromospheric Temperature Gradient on the Width of Hα in Late-Type Giants. D. M. Zarro. **285**, 232, 112-D11 (1984)
- Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. V. Line Formation in a Static Atmosphere. C. Rogers. **286**, 659, 130-D1 (1984)
- Line Identifications**
- Comments on the Ultraviolet Spectrum of γ² Velorum. Jorge Sahade, Yoji Kondo, and George E. McCluskey, Jr. **276**, 281, 3-G11 (1984)
- Infrared and Far-Infrared Transition Frequencies for the CH₂ Radical. Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown. **276**, 399, 5-B7 (1984)
- 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. J. H. Lucy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult. **276**, 533, 7-D4 (1984)
- Is Quasar QS 0630 + 180 Found in the Gamma-Ray Error Box of CG 195 + 4 a Proton Quasar? R. Schlickeiser. **277**, 485, 17-D3 (1984)
- On Absorption by Hot Interstellar Gas. I. [Fe x] λ6375. L. M. Hobbs. **280**, 132, 50-D10 (1984)
- The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. S. J. Daunt, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault. **280**, 921, 59-G9 (1984)
- A Search for Interstellar Silicon Nitride. L. M. Ziurys, D. P. Clemens, R. J. Saykally, M. Colvin, and H. F. Schaefer. **281**, 219, 63-C9 (1984)
- The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr. **281**, 303, 64-C1 (1984)
- On Absorption by Hot Interstellar Gas. II. [Fe xiv] λ5303. L. M. Hobbs and C. E. Albert. **281**, 639, 69-E3 (1984)
- Detection of U45.379: An Intense, Peculiar Unidentified Line. H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito. **282**, 197, 76-B1 (1984)
- On the Detection of Positrons via the Optical Lines of Positronium. Jeffrey E. McClintock. **282**, 291, 77-A12 (1984)
- On the Magnetic Field in the White Dwarf Grw + 70° 8247. Ronald J. W. Henry and R. F. O'Connell. **282**, L97, 85-D14 (1984)
- Line Identifications in the Ultraviolet (2590-3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton. **283**, 760, 95-C2 (1984)
- Identification of the SiCC Radical toward IRC + 10216: The First Molecular Ring in an Astronomical Source. P. Thaddeus, S. E. Cummins, and R. A. Linke. **283**, L45, 97-B8 (1984)
- Spectrophotometry of Intermediate-Redshift Quasars. Alan Uomoto. **284**, 497, 104-E7 (1984)
- The Methyl Cyanide Hot and Warm Cores in Orion: Statistical Equilibrium Excitation Models of a Symmetric-Top Molecule. Robert B. Loren and Lee G. Mundy. **286**, 232, 124-D10 (1984)
- ¹³CH₃OH in OMC-1. Geoffrey A. Blake, E. C. Sutton, C. R. Masson, T.

Line Identifications—Continued

- G. Phillips, Eric Herbst, Grant M. Plummer, and Frank C. De Lucia. **286**, 586, 129-E8 (1984)
- The Detection of $F^1\Pi_u-X^1\Sigma_g^+$ System of Diatomic Carbon toward X Persei. David J. Lien. **287**, 195, 145-F4 (1984)
- An Atlas of Late-Type Stellar Spectra, 2400–2778 Inverse Centimeters. Stephen T. Ridgway, Duane F. Carbon, Donald N. B. Hall, and Jack Jewell. **54**, 177, 4-A2 (1984) (Abstr. in **276**, 798, 10-B10)
- Laboratory Millimeter and Submillimeter Spectra of HNO and DNO. K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- The Millimeter and Submillimeter Laboratory Spectrum of Methyl Formate in its Ground Symmetric Torsional State. Grant M. Plummer, Eric Herbst, Frank C. De Lucia, and Geoffrey A. Blake. **55**, 633, 20-C10 (1984) (Abstr. in **282**, 821, 84-A11)
- A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. G. A. Doschek and R. D. Cowan. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- Line Profiles**
- The Three-dimensional Structure of a Circumstellar Maser. P. F. Bowers and Mark Morris. **276**, 646, 8-E9 (1984)
- Measurements of Zeeman Broadening in F, G, and K Dwarfs. David F. Gray. **277**, 640, 19-A13 (1984)
- Asymmetries in the Spectral Lines of Procyon and κ Cancri. John B. Rice and William H. Wehlau. **278**, 721, 33-G1 (1984)
- Emission-Line Profiles in Low-Redshift QSOs. James M. Shuder. **280**, 491, 55-C3 (1984)
- C IV $\lambda 1550$ Emission Profiles in IUE Spectra of Seyfert 1 Galaxies. Ronald Stoner and Roger Prak. **280**, 516, 55-D14 (1984)
- The Influence of Electron Scattering on the He II Line Profiles of HD 50896. D. J. Hillier. **280**, 744, 58-A1 (1984)
- The Applicability of the Fourier Convolution Theorem to the Analysis of Late-Type Stellar Spectra. David H. Bruning. **281**, 830, 71-E7 (1984)
- Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry. **282**, 226, 76-D2 (1984)
- The Ha Spectral Signatures of Solar Flare Nonthermal Electrons, Conductive Flux, and Coronal Pressure. Richard C. Canfield, Todd A. Gunkler, and Paul J. Ricchiazzi. **282**, 296, 77-B3 (1984)
- Analysis of Magnesium XI Line Profiles from Solar Active Regions. R. L. Blake, R. D. Cowan, H. Felthaus, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark. **282**, 784, 83-E13 (1984)
- Line Profile Variation in Δ Orionis A, ι Orionis A, and 15 Monocerotis. C. A. Grady, T. P. Snow, and W. C. Cash. **283**, 218, 88-D4 (1984)
- Observations of Broad Helium and Hydrogen Lines in the Very Center of the Galaxy. T. R. Geballe, Kevin Krisciunas, T. J. Lee, Ian Galtay, Richard Wade, W. D. Duncan, Ron Garden, and E. E. Becklin. **284**, 118, 99-D1 (1984)
- Characteristics of the Fe II and C II Emission in High-Resolution IUE Spectra (2300–3000 Å) of Alpha Orionis. Kenneth G. Carpenter. **285**, 181, 112-A1 (1984)
- An Efficient Method for Computing Spectral Line Profiles in Stellar Envelopes. Claude Bertout. **285**, 269, 112-G6 (1984)
- NGC 7213: A Key to the Nature of Liners? Alexei V. Filippenko and J. P. Halpern. **285**, 458, 116-D10 (1984)
- An Analysis of the Narrow-Line Profiles in High Ionization Seyfert Galaxies. M. M. De Robertis and D. E. Osterbrock. **286**, 171, 123-G5 (1984)
- Shock Waves in Mira Variables. I. Emission-Line Spectra. M. W. Fox, P. R. Wood, and M. A. Dopita. **286**, 337, 125-E8 (1984)
- Rotational Velocities of Later B Type and A Type Stars as Determined from Ultraviolet versus Visual Line Profiles. Kenneth G. Carpenter, Arne Slettebak, and George Sonneborn. **286**, 741, 131-C2 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek. **286**, 787, 131-F6 (1984)
- Line Emission from H II Blister Models. Robert H. Rubin. **287**, 653, 141-D8 (1984)
- Luminosity Function**
- The Einstein Galactic Plane Survey: Statistical Analysis of the Complete X-Ray Sample. Paul Hertz and Jonathan E. Grindlay. **278**, 137, 25-E3 (1984)
- The X-Ray Luminosity Function of Abell Clusters at a Redshift of 0.25. J. Patrick Henry and Russell J. Lavery. **280**, 1, 49-A6 (1984)
- Luminosity Enhancement in Relativistic Jets and Altered Luminosity Functions for Beamed Objects. C. M. Urry and R. A. Shafer. **280**, 569, 55-A14 (1984)
- Cooling of Low-Mass Carbon-Oxygen Dwarfs from the Planetary Nucleus Stage through the Crystallization Stage. Icko Iben, Jr. and Alexander V. Tutukov. **282**, 615, 81-F13 (1984)
- The Effect of the Perturbation of the Local Velocity Field by Virgo on the Calculation of Differential Luminosity Functions. R. G. Kraan-Korteweg, Allan Sandage, and G. A. Tammann. **283**, 24, 86-C7 (1984)
- A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- Very Low Luminosity Active Galaxies and the X-Ray Background. Martin Elvis, Andrzej Soltan, and William C. Keel. **283**, 479, 92-A13 (1984)
- X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. Tommaso Maccacaro, Isabella M. Gioia, and John T. Stocke. **283**, 486, 92-B6 (1984)
- A Far-Infrared Survey of the Galactic Center. Sten F. Odenwald and Giovanni G. Fazio. **283**, 601, 93-D14 (1984)
- Cosmological Evolution of Radio Sources Found at 1.4 GHz. J. J. Condon. **284**, 44, 98-D7 (1984)
- The Evolution of Asymptotic Giant Branch Stars in the Large Magellanic Cloud. Neill Reid and Jeremy Mould. **284**, 98, 99-A14 (1984)
- The Initial Mass Function for Massive Stars in the Galaxy and the Magellanic Clouds. Roberta M. Humphreys and Douglas B. McElroy. **284**, 565, 105-C6 (1984)
- The Structure and Dynamics of the Open Cluster M11. Robert D. Mathieu. **284**, 643, 106-B2 (1984)
- Ages of Globular Clusters from Their Luminosity Functions. Bohdan Paczyński. **284**, 670, 106-D1 (1984)
- Studies of Late-Type Dwarfs. VI. Identification of Population II Main-Sequence Stars at $M_V = +14$. F. D. A. Hartwick, A. P. Cowley, and J. R. Mould. **286**, 269, 124-G6 (1984)
- The NGC 5128 Globular Cluster System: Star Counts in U, V, and R. Gretchen L. H. Harris, James E. Hesser, Hugh C. Harris, and Patrick J. Curry. **287**, 175, 134-G7 (1984)
- Cosmological Evolution of Radio Sources. J. J. Condon. **287**, 461, 139-C1 (1984)
- An X-Ray Survey of Clusters of Galaxies. IV. A Survey of Southern Clusters and a Compilation of Upper Limits for Both Abell and Southern Galaxies. M. P. Kowalski, M. P. Ulmer, R. G. Cruddace, and K. S. Wood. **56**, 403, 29-A9 (1984) (Abstr. in **286**, 822, 132-A13)
- Magnetic Fields**
- Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda. **279**, 515, 43-D13 (1984)
- The Identification of Hydrogen in Grw + 70° 8247. Jesse L. Greenstein. **281**, L47, 67-A1 (1984)
- On the Magnetic Field in the White Dwarf Grw + 70° 8247. Ronald J. W. Henry and R. F. O'Connell. **282**, L97, 85-D14 (1984)
- The Role of the Galactic Magnetic Field in the Evolution of a Dark Globular Filament in Cygnus. David McDavid. **284**, 141, 99-E10 (1984)
- Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. Rida Farouki, Stuart L. Shapiro, and Ira Wasserman. **284**, 282, 101-B3 (1984)
- Pair Production Rates in Mildly Relativistic, Magnetized Plasmas. Michael L. Burns and Alice K. Harding. **285**, 747, 119-F1 (1984)
- Comment on "Scaling Laws for Hydrogen-like Atoms in Magnetic Fields of Arbitrary Strength". H. Herold, H. Ruder, and G. Wunner. **285**, 870, 121-A1 (1984)
- The Appearance of Magnetic Flux on the Surfaces of the Early Main-Sequence F Stars. Mark S. Giampapa and Robert Rosner. **286**, L19, 126-E7 (1984)
- A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. Y. Matsui, Knox S. Long, John R. Dickel, and Eric W. Greisen. **287**, 295, 136-B9 (1984)
- Relativistic Electron Transport in a Quantizing Magnetic Field. Lars Hernquist. **56**, 325, 27-C7 (1984) (Abstr. in **285**, 875, 121-A6)
- Magnetohydrodynamics: see Hydromagnetics**
- Masers**
- Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson. **276**, 572, 7-G4 (1984)
- The Three-dimensional Structure of a Circumstellar Maser. P. F. Bowers and Mark Morris. **276**, 646, 8-E9 (1984)
- Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. J. M. Benson and K. J. Johnston. **277**, 181, 13-A1 (1984)
- IRAS Observations of OH/IR Stars. F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch. **278**, L41, 29-E13 (1984)

- VLA Observations of 1612 and 1667 MHz OH Masers Associated with IRC +10420. *P. F. Bowers*. **279**, 350, 40-G3 (1984)
- The Polarization of the SiO Masers in Orion: Maser Emission from a Rotating, Expanding Disk? *Richard Barvainis*. **279**, 358, 40-B11 (1984)
- The Peculiar Galaxy IC 4553: VLA-A Observations of the OH Megamaser. *Willem A. Baan and Aubrey D. Haschick*. **279**, 541, 43-F12 (1984)
- Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. *R. R. Sharma and Loukas Vlahos*. **280**, 405, 53-D1 (1984)
- H₂O in W49N. II. Statistical Studies of Hyperfine Structure, Clustering, and Velocity Distributions. *R. C. Walker*. **280**, 618, 56-E10 (1984)
- 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. *T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann*. **283**, 106, 87-B13 (1984)
- SiO Flux Measurements of Variable Stars. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson*. **283**, 174, 88-A2 (1984)
- Ultracompact Structure in the H II Region W49N. *J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker*. **283**, 632, 93-G6 (1984)
- A Search for O¹⁸H Maser Emission from G351.8 - 0.5. *John D. Fix and Robert L. Mutel*. **283**, 653, 94-A14 (1984)
- SiS in Circumstellar Shells. *R. Sahai, Alwyn Wootten, and R. E. S. Clegg*. **284**, 144, 99-F2 (1984)
- Theory of Astrophysical SiO Masers. *S. H. Langer and W. D. Watson*. **284**, 751, 107-C1 (1984)
- Infrared Pumping for HC₃N in the Circumstellar Envelope of IRC +10216. *Shuji Deguchi and Masakatsu Ueyemura*. **285**, 153, 111-E12 (1984)
- Linear Polarization of Astronomical Masers and Magnetic Fields. *L. R. Western and W. D. Watson*. **285**, 158, 111-F3 (1984)
- Luminosities and Mass-Loss Rates of OH/H₂O Maser Stars. *P. F. Bowers and Wendy Hagen*. **285**, 637, 118-E12 (1984)
- Thermal and Maser Molecular Lines from the Envelope of IRC +10216. *Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner*. **286**, 276, 125-A1 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. *Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum*. **286**, 302, 125-C1 (1984)
- A Search for 183 GHz Emission from Water in Late-Type Stars. *T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodriguez Kuiper, and P. Zimmermann*. **286**, 310, 125-C9 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). *J. S. Miller, F. O. Clark, and T. H. Troland*. **287**, 892, 144-A7 (1984)
- OH Maser Emission from Warm Variable Stars. *John D. Fix and Mark J. Claussen*. **287**, 135, 138-E8 (1984)
- Discovery of a Young Stellar Object near the Water Masers in W3(OH). *J. L. Turner and W. J. Welch*. **287**, L81, 145-E6 (1984)
- Mass-Luminosity Relation**
- Theoretical Zero-Age Main Sequences Applied to the Pleiades, Praesepe, and Hyades Star Clusters. *Don A. Vandenberg and Terry J. Bridges*. **278**, 679, 33-C14 (1984)
- Constraints on the Orbits of Multiple Nuclei in Brightest Cluster Galaxies. *John L. Tonry*. **279**, 13, 37-B5 (1984)
- Metal-Poor Stars: see Stars: Weak-Line**
- Meteors and Meteorites**
- An Intercontinental Baseline Coincidence Search for Optical Flashes with Two Schmidt Telescopes. *Bradley E. Schaefer, Roland Vanderspek, Hale V. Bradt, and George R. Ricker*. **283**, 887, 96-E8 (1984)
- Neutron Capture Nucleosynthesis of Neodymium Isotopes and the s-Process from $A = 130$ to 150 . *G. J. Mathews and F. Käppeler*. **286**, 810, 132-A1 (1984)
- Microwave Radiation: see Radio Sources**
- Mira Variables: see Stars: Long-Period Variables**
- Molecular Processes**
- 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lacy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult*. **276**, 533, 7-D4 (1984)
- Infrared Molecular Emissions from Comets. *H. A. Weaver and M. J. Mumma*. **276**, 782, 10-A8 (1984)
- Interstellar O₂. I. Abundance, Excitation, and Prospects for Detection of ¹⁶O¹⁸O at Radio Frequencies. *John H. Black and Peter L. Smith*. **277**, 562, 18-B12 (1984)
- Photodissociation of OH in Interstellar Clouds. *Ewine F. van Dishoeck and A. Dalgarno*. **277**, 576, 18-C12 (1984)
- Carbon and Oxygen Isotope Fractionation in Dense Interstellar Clouds. *William D. Langer, T. E. Graedel, Margaret A. Frerking, and P. B. Armentrout*. **277**, 581, 18-D4 (1984)
- Metastability of Isoformyl Ions in Collisions with Helium and Hydrogen. *Sheldon Green*. **277**, 900, 22-A1 (1984)
- Laboratory Measurements of the Millimeter-Wave Spectrum of Magnesium Monoxide. *T. C. Steimle, Y. Azuma, and P. G. Carrick*. **277**, L21, 16-B6 (1984)
- Laboratory Millimeter-Wave Spectrum of Iron Monoxide, FeO. *Yasuki Endo, Shuji Saito, and Eizi Hirota*. **278**, L131, 36-D13 (1984)
- CN and C₂H in IRC +10216. *P. J. Huggins, A. E. Glassgold, and Mark Morris*. **279**, 284, 40-B5 (1984)
- The Chemistry of Phosphorus in Dense Interstellar Clouds. *L. R. Thorne, V. G. Anicich, S. S. Prasad, and W. T. Huntress, Jr.*. **280**, 139, 50-E3 (1984)
- The 12 Micron Band of Ethane: High-Resolution Laboratory Analysis with Candidate Lines for Infrared Heterodyne Searches. *S. J. Daunt, A. K. Atakan, W. E. Blass, G. W. Halsey, D. E. Jennings, D. C. Reuter, J. Susskind, and J. W. Brault*. **280**, 921, 59-G9 (1984)
- The Cyanopolynes as a Chemical Clock for Molecular Clouds. *Steven W. Stahlner*. **281**, 209, 63-B13 (1984)
- The Radiative Lifetime of the ⁵S₂ Metastable Level of O⁺⁺. *B. Carol Johnson, Peter L. Smith, and R. D. Knight*. **281**, 477, 65-B6 (1984)
- Photodissociation Rates of Molecules by the Interstellar Radiation Field. *Long C. Lee*. **282**, 172, 75-G4 (1984)
- The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. *A. J. Saul, N. Grevesse, J. W. Brault, G. M. Stokes, and R. Zander*. **282**, 330, 77-D9 (1984)
- Cyanide and Isocyanide Abundances in the Cold, Dark Cloud TMC-1. *William M. Irvine and F. Peter Schloerb*. **282**, 516, 80-F12 (1984)
- Temporal and Spatial Behavior of the Ultraviolet Emissions of Comet Iras-Araki-Alcock 1983d. *P. D. Feldman, M. F. A'Hearn, and R. L. Millis*. **282**, 799, 83-F14 (1984)
- Thermal Instability in Molecular Clouds. *David L. Gilden*. **283**, 679, 94-D1 (1984)
- Hydrogen Dimer Structures in the Far-Infrared Spectra of Jupiter and Saturn. *Lothar Frommhold, Robert Samuelson, and George Birnbaum*. **283**, L79, 97-D14 (1984)
- A Reanalysis of the Interstellar CH Abundance. *David J. Lien*. **284**, 578, 105-D5 (1984)
- Interstellar Matter near the Pleiades. II. CH Formation. *Richard E. White*. **284**, 695, 106-E12 (1984)
- Dissociative Recombination Coefficients for H₃⁺, HCO⁺, N₂H⁺, and CH₃⁺ at Low Temperature: Interstellar Implications. *D. Smith and N. G. Adams*. **284**, L13, 103-A14 (1984)
- On the Excitation of CH Microwave Lines. *V. Bujarrabal, I. Gonzalo, and F. Salinas*. **285**, 312, 113-C10 (1984)
- Theoretical Reinvestigation of Hydrocarbon and Cyanoacetylene Abundances in TMC-1. *Eric Herbst, Nigel G. Adams, and David Smith*. **285**, 618, 118-C7 (1984)
- Vibrational and Rotational Excitation of CO in Comets: Nonequilibrium Calculations. *G. Chin and H. A. Weaver*. **285**, 858, 120-G2 (1984)
- Infrared Molecular Emissions from Comets: Erratum. *H. A. Weaver and M. J. Mumma*. **285**, 872, 121-A3 (1984) (Orig. paper in **276**, 782, 10-A8)
- Low-Temperature Dissociative Recombination of e⁻ + H₃⁺. *H. H. Michels and R. H. Hobbs*. **286**, L27, 126-F1 (1984)
- The CN Radical in Diffuse Interstellar Clouds. *S. R. Federman, A. C. Danks, and D. L. Lambert*. **287**, 219, 135-C11 (1984)
- Oscillator Strengths of the C₂ A¹Π_g-X¹Σ_g⁺ Phillips System. *Sumner P. Davis, Wm. Hayden Smith, James W. Brault, Rubén Pecnyer, and Jeremy Wagner*. **287**, 455, 137-G7 (1984)
- Effects of Shocks on the Sulfur Chemistry of a Dense Interstellar Cloud. *George F. Mitchell*. **287**, 665, 141-E6 (1984)
- Reevaluation of the Rate Constants for the Reactions C⁺ + H₂ → CH⁺ + H and CH⁺ + H → C⁺ + H₂ at Temperatures Characteristic of Ambient and Shocked Diffuse Interstellar Clouds. *Walter J. Chesnavich, Victor E. Akin, and Douglas A. Webb*. **287**, 676, 141-F3 (1984)
- Deuterium Fractionation Mechanisms in Interstellar Clouds. *A. Dalgarno and S. Lepp*. **287**, L47, 138-F5 (1984)
- Laboratory Millimeter and Submillimeter Spectra of HNO and DNO. *K. V. L. N. Sastry, Paul Helminger, Grant M. Plummer, Eric Herbst, and Frank C. De Lucia*. **55**, 563, 19-B7 (1984) (Abstr. in **282**, 820, 84-A10)
- The Millimeter and Submillimeter Laboratory Spectrum of Methyl Formate in its Ground Symmetric Torsional State. *Grant M. Plummer, Eric Herbst, Frank C. De Lucia, and Geoffrey A. Blake*. **55**, 633, 20-C10 (1984) (Abstr. in **282**, 821, 84-A11)
- A Set of Partition Functions and Equilibrium Constants for 300 Diatomic Molecules of Astrophysical Interest. *A. J. Saul and J. B. Tatum*. **56**, 193, 25-A2 (1984) (Abstr. in **284**, 869, 108-E1)
- Synthesis of Complex Molecules in Dense Interstellar Clouds via

Molecular Processes—Continued

Gas-Phase Chemistry: A Pseudo Time-dependent Calculation. *Chun Ming Leung, Eric Herbst, and Walter F. Huebner*. **56**, 231, 25-D7 (1984) (Abstr. in **284**, 870, 108-E2)

Nebulae: Abundances

- Radiative Shock-Wave Theory. I. Chemical Abundance Diagnostics and Galactic Abundance Gradients. *Michael A. Dopita, Luc Binette, Sandro D'Odorico, and Piero Benvenuti*. **276**, 653, 8-F2 (1984)
- Formaldehyde in the Orion Molecular Flow: Evidence for a Gentle Acceleration. *Alwyn Wootten, Robert B. Loren, and J. Bally*. **277**, 189, 13-A9 (1984)
- Ionized Magnesium in the Planetary Nebula NGC 7027. *S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant*. **277**, 207, 13-B13 (1984)
- Coronal [Fe] Lines in Supernova Remnants: Nonequilibrium Ionization Models. *Richard G. Teske*. **277**, 832, 21-B13 (1984)
- Observations of Heavy Element Radio Recombination Lines from C II Regions. *Peter R. Silverglede*. **278**, 604, 32-E1 (1984)
- Chemical Abundances in a New Halo Planetary Nebula. *Timothy Barker and Kyle M. Cudworth*. **278**, 610, 32-E8 (1984)
- Near-Infrared Spectrophotometry of Crab Nebula Filaments. *Richard B. C. Henry, Gordon M. MacAlpine, and Robert P. Kirshner*. **278**, 619, 32-F8 (1984)
- Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. *William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull*. **279**, 708, 45-E7 (1984)
- Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. *Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes*. **280**, 615, 56-E7 (1984)
- The 8.7 GHz Hyperfine Line of $^3\text{He}^+$ in Galactic H II Regions. *Robert T. Rood, T. M. Bania, and T. L. Wilson*. **280**, 629, 56-F7 (1984)
- Models of Four Highly Obscured Compact H II Regions. *J. P. Simpson and Robert H. Rubin*. **281**, 184, 63-A1 (1984)
- The Unusual Nickel/Iron Abundance Ratio in the Crab Nebula Filaments. *Richard B. C. Henry*. **281**, 644, 69-E8 (1984)
- Detection of the [Ne III] 36 Micron Line in the Planetary Nebula NGC 6543. *M. A. Shure, J. R. Houck, G. E. Gull, and T. Herter*. **281**, L29, 65-G1 (1984)
- Spectrophotometry of Young Supernova Remnants. *Michael A. Dopita and Ian R. Tuohy*. **282**, 135, 75-D7 (1984)
- A Search for O^{18}H Maser Emission from G351.8 – 0.5. *John D. Fix and Robert L. Mutel*. **283**, 653, 94-A14 (1984)
- A Search for High-Velocity Carbon Monosulfide Emission in Star-Forming Regions. *Harley A. Thronson, Jr. and Charles J. Lada*. **284**, 135, 99-E4 (1984)
- The Ionization Structure of Planetary Nebulae. IV. NGC 6853. *Timothy Barker*. **284**, 589, 105-E2 (1984)
- Abundances in Galactic H II Regions. III. G25.4 – 0.2, G45.5 + 0.06, M8, S159, and DR 22. *J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones*. **285**, 174, 111-G5 (1984)
- The Unique Planetary Nebula NGC 2818. *Reginald J. Dufour*. **287**, 341, 136-F3 (1984)
- Line Emission from H II Blister Models. *Robert H. Rubin*. **287**, 653, 141-D8 (1984)
- Nitrogen and Helium Enrichment in Four Wolf-Rayet Ring Nebulae. *Karen B. Kwitter*. **287**, 840, 143-D9 (1984)

Nebulae: Crab Nebula

- Near-Infrared Spectrophotometry of Crab Nebula Filaments. *Richard B. C. Henry, Gordon M. MacAlpine, and Robert P. Kirshner*. **278**, 619, 32-F8 (1984)
- Far-Infrared Observations of the Crab Nebula. *P. L. Marsden, F. C. Gillett, R. E. Jennings, J. P. Emerson, T. de Jong, and F. M. Olmon*. **278**, L29, 29-E3 (1984)
- The Unusual Nickel/Iron Abundance Ratio in the Crab Nebula Filaments. *Richard B. C. Henry*. **281**, 644, 69-E8 (1984)
- Einstein Observations of the Crab Nebula Pulsar. *F. R. Harnden, Jr. and F. D. Seward*. **283**, 279, 89-A12 (1984)
- Confinement of the Crab Pulsar's Wind by Its Supernova Remnant. *C. F. Kennel and F. V. Coroniti*. **283**, 694, 94-E2 (1984)
- Magnetohydrodynamic Model of Crab Nebula Radiation. *C. F. Kennel and F. V. Coroniti*. **283**, 710, 94-F4 (1984)
- The Kinematics of the Crab Nebula's Jet. *Peter Shull, Jr., Uri Carsenty, Michael Sarcander, and Thorsten Neckel*. **285**, L75, 121-F9 (1984)
- Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. *G. J. Ferland and R. F. Mushotzky*. **286**, 42, 122-D4 (1984)
- Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. *J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley*. **286**, L35, 132-D6 (1984)

Nebulae: General

- Methyl Acetylene as a Temperature Probe for Dense Interstellar Clouds. *T. B. H. Kuiper, E. N. Rodriguez Kuiper, Dale F. Dickinson, B. E. Turner, and B. Zuckerman*. **276**, 211, 3-B9 (1984)
- A High-Resolution Study of Herbig-Haro Objects 1 and 2. *L. Hartmann and J. C. Raymond*. **276**, 560, 7-F4 (1984)
- Continuum Models for Gas in Disturbed Galaxies. II. Stability of Simplified Model Systems. *Curtis Struck-Marcell and John M. Scalo*. **277**, 132, 12-D3 (1984)
- On the Dynamics in Evaporating Cloud Envelopes. *John L. Giuliani, Jr.*. **277**, 605, 18-E14 (1984)
- Ambipolar Diffusion in Equilibrium Self-gravitating Gaseous Configurations. I. Plane-parallel Slabs. *Eugene Howard Scott*. **278**, 396, 28-C5 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. *B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius*. **278**, L53, 29-F12 (1984)
- Duplicity of the "Supermassive" Object R136a. *Charles E. Worley*. **278**, L109, 36-B12 (1984)
- Criteria for Collapse and Fragmentation of Rotating, Isothermal Clouds. *Shoken M. Miyama, Chushiro Hayashi, and Shinji Narita*. **279**, 621, 44-E11 (1984)
- X-Ray Nebular Models. II. Constant Pressure Clouds. *T. R. Kallman*. **280**, 269, 52-A3 (1984)
- Wave-Mode Interaction in Magneto-gravitating Plasma. *S. S. Aggarwal and G. L. Kalra*. **280**, 792, 58-D14 (1984)
- NGC 6334-V—An Infrared Bipolar Nebula. *Paul M. Harvey and Bruce A. Wilking*. **280**, L19, 54-D9 (1984)
- A New Type of Extended Nonthermal Radio Emitter: Detection of the Old Nova GK Persei. *Stephen P. Reynolds and Roger A. Chevalier*. **281**, L33, 66-G4 (1984)
- Radiatively Driven Dust-bounded Implosion: Formation and Stability of Dense Globules. *Maxwell T. Sandford II, Rodney W. Whitaker, and Richard I. Klein*. **282**, 178, 75-G10 (1984)
- The Inner Core of a Bok Globule. *Terry Jay Jones, A. R. Hyland, and Jeremy Bailey*. **282**, 675, 82-D5 (1984)
- Large-Scale Structure of Molecular Gas in Heiles Cloud 2: A Remarkable Rotating Ring. *F. Peter Schloerb and Ronald L. Snell*. **283**, 129, 87-D8 (1984)
- Can the Ballistic Particle Model Explain the Hubble Sequence? *David Leisawitz and Frank Bash*. **285**, 25, 110-C2 (1984)
- Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. *G. J. Ferland and R. F. Mushotzky*. **286**, 42, 122-D4 (1984)
- The Collapse of the Cores of Slowly Rotating Isothermal Clouds. *Susan Terebey, Frank H. Shu, and Patrick Cassen*. **286**, 529, 129-A5 (1984)
- Bipolar Outflows in Dark Clouds. *Paul F. Goldsmith, Ronald L. Snell, Mark Hemeon-Heyer, and William D. Langer*. **286**, 599, 129-F7 (1984)
- High-Velocity HCO^+ in Cepheus A: Ionization Levels in High-Density Clumps within a Molecular Flow. *Robert B. Loren, Alwyn Wootten, Aa. Sandqvist, P. Friberg, and A. Hjalmarson*. **287**, 707, 142-A11 (1984)
- The Gas Density Gradient for Three Dark Interstellar Clouds. *Stuart A. Fulkerson and Frank O. Clark*. **287**, 723, 142-B14 (1984)
- Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. *H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith*. **287**, 801, 143-A10 (1984)
- On Bowen Enhancement of the N III Spectrum under Solar and Nebulae Conditions. *S. O. Kastner and A. K. Bhatia*. **287**, 945, 144-E4 (1984)
- H I Shells, Supershells, Shell-like Objects, and "Worms". *Carl Heiles*. **55**, 585, 19-D1 (1984) (Abstr. in **282**, 821, 84-A11)

Nebulae: H II Regions

- The Star-forming Region in Cepheus A. *V. A. Hughes and J. G. A. Wouterloot*. **276**, 204, 3-B2 (1984)
- The High-Ionization and Excited-State Interstellar Lines in the Carina Nebula: A Giant H II Region in Absorption. *Nolan R. Walborn, Joy N. Heckathorn, and James E. Hesser*. **276**, 524, 7-C9 (1984)
- Anomalous Emission Regions in Irregular Galaxies. *Deidre A. Hunter*. **276**, L35, 10-E7 (1984)
- Shell Structure in Ultracompact H II Regions. *B. E. Turner and H. E. Matthews*. **277**, 164, 12-F9 (1984)
- Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. *J. M. Benson and K. J. Johnston*. **277**, 181, 13-A1 (1984)
- Optical Properties of the Knots in NGC 7385. *S. M. Simkin, G. V. Bicknell, and A. Bosma*. **277**, 513, 17-F3 (1984)
- Images in the Rocket Ultraviolet: Photometry of M101. *Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher*. **277**, 542, 18-A5 (1984)
- Star Formation in the M8E Region. *M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders*. **278**, 170, 25-G8 (1984)

- Observations of Heavy Element Radio Recombination Lines from C II Regions. *Peter R. Silverglete*. **278**, 604, 32-E1 (1984)
- Photoionized Stellar Wind Bubbles in a Cloudy Medium. *Christopher F. McKee, Dave Van Buren, and Bernard Lazareff*. **278**, L115, 36-C3 (1984)
- Optical H II Regions in the Outer Galaxy. *Michel Fich and Leo Blitz*. **279**, 125, 38-C12 (1984)
- Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. *S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley*. **279**, 162, 38-F11 (1984)
- The Formation of Massive Stars along the W5 Ionization Front. *B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering*. **279**, 291, 40-B12 (1984)
- Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. *Bel Campbell and Rodger I. Thompson*. **279**, 650, 45-A5 (1984)
- Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. *William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull*. **279**, 708, 45-E7 (1984)
- Detection of Far-Infrared [O I] and [O III] Emission from the Galaxy M82. *Dan M. Watson, R. Genzel, C. H. Townes, M. W. Werner, and J. W. V. Storey*. **279**, L1, 42-D3 (1984)
- The Massive Core of W51. *D. T. Jaffe, E. E. Becklin, and R. H. Hildebrand*. **279**, L51, 48-B8 (1984)
- NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein*. **280**, 154, 50-F5 (1984)
- The Kinematics of Giant Extragalactic H II Regions. *Evan D. Skillman and Bruce Balick*. **280**, 580, 56-B11 (1984)
- The 8.7 GHz Hyperfine Line of $^3\text{He}^+$ in Galactic H II Regions. *Robert T. Rood, T. M. Bania, and T. L. Wilson*. **280**, 629, 56-F7 (1984)
- On Hydrogen Line Emission from Regions Exposed to Strong Radiation Fields. *Moshe Elitzur*. **280**, 653, 57-A6 (1984)
- Models of Four Highly Obscured Compact H II Regions. *J. P. Simpson and Robert H. Rubin*. **281**, 184, 63-A1 (1984)
- Ultraviolet Interstellar Absorption toward Stars in the Small Magellanic Cloud. II. *Sk 159. Edward L. Fitzpatrick*. **282**, 436, 80-A1 (1984)
- VLA Observations of Collimated Outflow at NGC 7538 IRS 1. *Bel Campbell*. **282**, L27, 78-C2 (1984)
- High Spatial Resolution Observations of Orion Bright Bar: CS ($J = 1-0$) and H51 α Emission. *T. Omodaka, M. Hayashi, and T. Hasegawa*. **282**, L77, 85-C9 (1984)
- Ammonia Absorption toward NGC 7538 IRS 1: 2 Arc Second Observations in the (3,3) Line. *C. Henkel, T. L. Wilson, and K. J. Johnston*. **282**, L93, 85-D10 (1984)
- [O II] Studies of Galactic Planetary Nebulae and Extragalactic H II Complexes. *C. R. O'Dell and Hector O. Castañeda*. **283**, 158, 87-F14 (1984)
- Lyman and Balmer Continuum Ionization in Zero-Age Main-Sequence Stars: Applications to the Line Excess Phenomenon. *Rodger I. Thompson*. **283**, 165, 87-G7 (1984)
- Far-Infrared and Submillimeter Survey of the Galactic Plane from $l = 11^\circ 5$ to $l = 17^\circ 5$. *M. F. Campbell, R. F. Silverberg, W. F. Hoffmann, M. G. Hauser, D. W. Niles, M. Stier, H. A. Thronson, Jr., and T. Kelsall*. **283**, 566, 93-A10 (1984)
- Far-Infrared and CO Observations of the W33 Complex. *M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino*. **283**, 573, 93-B4 (1984)
- A Far-Infrared Survey of the Galactic Center. *Sten F. Odenwald and Giovanni G. Fazio*. **283**, 601, 93-D14 (1984)
- Ultracompact Structure in the H II Region W49N. *J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker*. **283**, 632, 93-G6 (1984)
- Kinematics and Dynamics of the H II Region Sharpless 142. I. The Velocity Field of the Ionized Hydrogen. *Gilles Joncas and Jean-René Roy*. **283**, 640, 94-A1 (1984)
- A Search for O^{18}H Maser Emission from G351.8 - 0.5. *John D. Fix and Robert L. Mutel*. **283**, 653, 94-A14 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper*. **284**, 597, 105-E12 (1984)
- On the Nature of the Wolf-Rayet Component in the Core of the Massive Galactic H II Region NGC 3603. *Anthony F. J. Moffat and Virpi S. Niemela*. **284**, 631, 106-A4 (1984)
- Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. *D. T. Jaffe, J. A. Davidson, M. Dragovan, and R. H. Hildebrand*. **284**, 637, 106-A10 (1984)
- Abundances in Galactic H II Regions. III. $\text{G}25.4 - 0.2$, $\text{G}45.5 + 0.06$, $\text{M}8$, $\text{S}159$, and $\text{DR} 22$. *J. L. Pipher, H. L. Helfer, T. Herter, D. A. Briotta, Jr., J. R. Houck, S. P. Willner, and B. Jones*. **285**, 174, 111-G5 (1984)
- Position-dependent Infrared Spectroscopy of M82: 100,000 Orion Nebulae? *B. Jones and J. M. Rodriguez-Espinoza*. **285**, 580, 117-G11 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. *T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen*. **286**, 573, 129-D9 (1984)
- The Molecular Disk in S106. *J. H. Bieging*. **286**, 591, 129-E13 (1984)
- Spectrophotometry of Compact Embedded Infrared Sources in the 0.6-1.0 Micron Wavelength Region. *P. J. McGregor, S. E. Persson, and J. G. Cohen*. **286**, 609, 129-G4 (1984)
- Structural Properties of Giant H II Regions in Nearby Galaxies. *Robert C. Kennicutt, Jr.*. **287**, 116, 134-B14 (1984)
- Extinction in Inhomogeneous Clouds. *A. Natta and N. Panagia*. **287**, 228, 135-D6 (1984)
- New Radio Sources at AFGL 2591: Young Cluster or Single Star? *Bel Campbell*. **287**, 334, 136-E10 (1984)
- Line Emission from H II Blister Models. *Robert H. Rubin*. **287**, 653, 141-D8 (1984)
- Discovery of a Young Stellar Object near the Water Masers in W3(OH). *J. L. Turner and W. J. Welch*. **287**, L81, 145-E6 (1984)
- The Case Low-Dispersion Northern Sky Survey. II. *N. Sanduleak and Peter Pesch*. **55**, 517, 17-F13 (1984) (Abstr. in **281**, 892, 72-C5)
- Nebulae: Individual** (arranged by Messier Number, NGC Number, and by Other Designation)
- By Messier Number
- Star Formation in the M8E Region. *M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders*. **278**, 170, 25-G8 (1984)
- [M8] The S201 Far-Ultraviolet Imaging Survey. III. A Field in Sagittarius. *George R. Carruthers and Thornton Page*. **55**, 101, 12-A3 (1984) (Abstr. in **279**, 911, 47-G2)
- By NGC Number
- Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. *Paul M. Harvey, Bruce A. Wilking, and Marshall Joy*. **278**, 156, 25-F8 (1984)
- The Reflection Nebula NGC 1999. *Jason A. Cardelli and K. H. Böhm*. **285**, 613, 118-C2 (1984)
- Photometric Study of NGC 2023 in the 3500 Å to 10000 Å Region: Confirmation of a Near-IR Emission Process in Reflection Nebulae. *Adolf N. Witt, Rudolph E. Schild, and James B. Krauman*. **281**, 708, 70-C3 (1984)
- NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein*. **280**, 154, 50-F5 (1984)
- The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO^+ Flow in NGC 2071. *Alwyn Wootten, Robert B. Loren, Aage Sandqvist, Per Friberg, and Ake Hjalmarson*. **279**, 633, 44-F14 (1984)
- The Unique Planetary Nebula NGC 2818. *Reginald J. Dufour*. **287**, 341, 136-F3 (1984)
- [NGC 3372] The High-Ionization and Excited-State Interstellar Lines in the Carina Nebula: A Giant H II Region in Absorption. *Nolan R. Walborn, Joy N. Heckathorn, and James E. Hesser*. **276**, 524, 7-C9 (1984)
- On the Nature of the Wolf-Rayet Component in the Core of the Massive Galactic H II Region NGC 3603. *Anthony F. J. Moffat and Virpi S. Niemela*. **284**, 631, 106-A4 (1984)
- Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. *William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull*. **279**, 708, 45-E7 (1984)
- The Ionization Structure of Planetary Nebulae. IV. NGC 6853. *Timothy Barker*. **284**, 589, 105-E2 (1984)
- Ionized Magnesium in the Planetary Nebula NGC 7027. *S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant*. **277**, 207, 13-B13 (1984)
- High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. *John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio*. **279**, 685, 45-C12 (1984)
- Mass Loss from Red Giants: A Simple Evolutionary Model for NGC 7027. *M. Jura*. **286**, 630, 130-A14 (1984)
- Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. *Paul M. Harvey, Bruce A. Wilking, and Marshall Joy*. **278**, 156, 25-F8 (1984)
- Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. *Bel Campbell and Rodger I. Thompson*. **279**, 650, 45-A5 (1984)
- By Other Designation: Names
- The Remarkable Ultraviolet Spectrum of the Planetary Nebula Abell 30. *J. Patrick Harrington and Walter A. Feibelman*. **277**, 716, 20-A1 (1984)

Nebulae: Individual—Continued

- Evidence for an Infrared Disk in the Core of the Extraordinary Planetary Nebula Abell 30. *Harriet L. Dinerstein and Daniel F. Lester*. **281**, 702, 70-B11 (1984)
- The Central Star of the Planetary Nebula Abell 78. *James B. Kaler and Walter A. Feibelman*. **282**, 719, 83-A1 (1984)
- X-Rays from Eta Carinae. *T. Chlebowski, F. D. Seward, J. Swank, and A. Szymkowiak*. **281**, 665, 69-G1 (1984)
- Explosive Nucleosynthesis in Massive Stars: Comparison with the Cassiopeia A Fast-moving Knots. *M. D. Johnston and A. Yahil*. **285**, 587, 118-A4 (1984)
- The Star-forming Region in Cepheus A. *V. A. Hughes and J. G. A. Wouterloot*. **276**, 204, 3-B2 (1984)
- The Ratio of Total to Selective Extinction in the Chamaeleon T1 and R Coronae Australis Dark Clouds. *F. J. Vrba and A. E. Rydgren*. **283**, 123, 87-D2 (1984)
- The Ratio of Total to Selective Extinction in the Chamaeleon T1 and R Coronae Australis Dark Clouds. *F. J. Vrba and A. E. Rydgren*. **283**, 123, 87-D2 (1984)
- International Ultraviolet Explorer Observations of Stars in 30 Doradus: Extinction and Stellar Continua. *Edward L. Fitzpatrick and Blair D. Savage*. **279**, 578, 44-B10 (1984)
- [30 Doradus] Properties of R136a as Derived from Its Optical Light Distribution. *You-Hua Chu, Joseph P. Cassinelli, and Mark G. Wolfire*. **283**, 560, 93-A4 (1984)
- IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovak, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
- The Kleinmann-Low Nebula: An Infrared Cavity. *C. G. Wynn-Williams, R. Genzel, E. E. Becklin, and D. Downes*. **281**, 172, 62-F14 (1984)
- The Pulsating Central Star of the Planetary Nebula Kohoutek 1-16. *Albert D. Grauer and Howard E. Bond*. **277**, 211, 13-C3 (1984)
- The Nature of the Embedded Population in the Rho Ophiuchi Dark Cloud: Mid-Infrared Observations. *Charles J. Lada and Bruce A. Wilking*. **287**, 610, 140-G8 (1984)
- Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. *J. M. Benson and K. J. Johnston*. **277**, 181, 13-A1 (1984)
- Magnetic Field Structure in the Taurus Dark Cloud. *Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry*. **282**, 508, 80-F4 (1984)
- Structure of the L1535 Dark Cloud and the Velocity Field in the Taurus Molecular Complex. *Paul F. Goldsmith and Michael F. Sernyak, Jr.*. **283**, 140, 87-E7 (1984)
- [Taurus Dark Cloud] Large-Scale Structure of the Taurus Molecular Complex. I. Density Fluctuations—A Fossil Jeans Length? *S. C. Kleiner and R. L. Dickman*. **286**, 255, 124-F6 (1984)
- [Taurus Dark Cloud] Cyanide and Isocyanide Abundances in the Cold, Dark Cloud TMC-1. *William M. Irvine and F. Peter Schloerb*. **282**, 516, 80-F12 (1984)
- [Taurus Molecular Cloud] Theoretical Reinvestigation of Hydrocarbon and Cyanoacetylene Abundances in TMC-1. *Eric Herbst, Nigel G. Adams, and David Smith*. **285**, 618, 118-C7 (1984)
- High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. *Edward B. Jenkins, George Wallerstein, and Joseph Silk*. **278**, 649, 33-A12 (1984)
- By Other Designation: Alphanumeric
- An Infrared Spatial Study of the Planetary Nebula BD +30°3639. *A. F. Bentley, J. A. Hackwell, G. L. Grasdale, and R. D. Gehrz*. **278**, 665, 33-B14 (1984)
- The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. *S. Beckwith, S. C. Beck, and I. Gatley*. **280**, 648, 57-A1 (1984)
- An Optical Investigation of the Peculiar Supernova Remnant CTB 80. *William P. Blair, Robert P. Kirshner, Robert A. Fesen, and Theodore R. Gull*. **282**, 161, 75-F6 (1984)
- The Molecular Cloud Associated with the Infrared Source GL 437. *Richard Arquilla and Paul F. Goldsmith*. **279**, 664, 45-B5 (1984)
- Radio Structure of the Proto-Planetary Nebula GL 618. *Sun Kwok and R. C. Bignell*. **276**, 544, 7-E1 (1984)
- New Radio Observations of the Composite Supernova Remnant G29.7 - 0.3. *R. H. Becker and D. J. Helfand*. **283**, 154, 87-F9 (1984)
- Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. *J. M. Benson and K. J. Johnston*. **277**, 181, 13-A1 (1984)
- Very High Resolution Observations of Compact Sources in the Direction of Supernova Remnants: G74.87 + 1.22. *Barry J. Geldzahler, David B. Shaffer, and Helmut Kühr*. **286**, 284, 125-A9 (1984)
- The Nature of the Filaments Northeast of the Supernova Remnant IC 443. *Robert A. Fesen*. **281**, 658, 69-F8 (1984)
- The Dust Content of the Planetary Nebula IC 3568. *Martin Cohen, J. Patrick Harrington, and Rhys Hess*. **283**, 687, 94-D9 (1984)
- [K3-50] Extinction in Inhomogeneous Clouds. *A. Natta and N. Panagia*. **287**, 228, 135-D6 (1984)
- Structure of the L1535 Dark Cloud and the Velocity Field in the Taurus Molecular Complex. *Paul F. Goldsmith and Michael F. Sernyak, Jr.*. **283**, 140, 87-E7 (1984)
- [MSH 15 - 52] The X-Ray Nebula around PSR 1509 - 58. *F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank*. **281**, 650, 69-E14 (1984)
- IUE Observations of the "Butterfly" Nebula M2-9. *Walter A. Feibelman*. **287**, 353, 136-G1 (1984)
- The O vi Nucleus of the Planetary Nebula M3-30. *James B. Kaler and Richard A. Shaw*. **278**, 195, 26-B6 (1984)
- [OH 231.8 + 4.2] The Three-dimensional Structure of a Circumstellar Maser. *P. F. Bowers and Mark Morris*. **276**, 646, 8-E9 (1984)
- [RCW 86] An X-Ray Study of the Remnant of SN 185 A.D. *Ryszard L. Pisarski, David J. Helfand, and Steven M. Kahn*. **277**, 710, 19-G7 (1984)
- Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. *Paul M. Harvey, Bruce A. Wilking, and Marshall Joy*. **278**, 156, 25-F8 (1984)
- The Molecular Disk in S106. *J. H. Bieging*. **286**, 591, 129-E13 (1984)
- An Aperture Synthesis Map of HCN Emission Close to W3 IRS 4. *Melvin C. H. Wright, Helene R. Dickel, and Paul T. P. Ho*. **281**, 171, 73-B6 (1984)
- W3 North: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., P. R. Schwartz, Howard A. Smith, Charles J. Lada, W. Glaccum, and D. A. Harper*. **284**, 597, 105-E12 (1984)
- The Formation of Massive Stars along the W5 Ionization Front. *B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering*. **279**, 291, 40-B12 (1984)
- Far-Infrared and CO Observations of the W33 Complex. *M. T. Stier, D. T. Jaffe, T. N. Rengarajan, G. G. Fazio, C. W. Maxson, B. McBreen, L. Loughran, S. Serio, and S. Sciortino*. **283**, 573, 93-B4 (1984)
- H₂O in W49N. II. Statistical Studies of Hyperfine Structure, Clustering, and Velocity Distributions. *R. C. Walker*. **280**, 618, 56-E10 (1984)
- Ultracompact Structure in the H II Region W49N. *J. W. Dreher, K. J. Johnston, W. J. Welch, and R. C. Walker*. **283**, 632, 93-G6 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. *T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen*. **286**, 573, 129-D9 (1984)
- X-Rays from the SNR 3C 391. *Z. R. Wang and F. D. Seward*. **279**, 705, 45-E4 (1984)
- Kinematics and Dynamics of the H II Region Sharpless 142. I. The Velocity Field of the Ionized Hydrogen. *Gilles Joncas and Jean-René Roy*. **283**, 640, 94-A1 (1984)
- Nebulae: Orion Nebula
- Formaldehyde in the Orion Molecular Flow: Evidence for a Gentle Acceleration. *Alwyn Wootten, Robert B. Loren, and J. Bally*. **277**, 189, 13-A9 (1984)
- The Polarization of the SiO Masers in Orion: Maser Emission from a Rotating, Expanding Disk? *Richard Barvainis*. **279**, 358, 40-B11 (1984)
- The Sub-Arc Second Structure of IRC2 at 5 Microns. *A. Chelli, C. Perrier, and P. Léna*. **280**, 163, 50-F14 (1984)
- The Structure of High-Velocity Gas in Orion and the Possible Role of IRC9. *S. C. Beck*. **281**, 205, 63-B9 (1984)
- The Unusual Nickel/Iron Abundance Ratio in the Crab Nebula Filaments. *Richard B. C. Henry*. **281**, 644, 69-E8 (1984)
- High Spatial Resolution Observations of Orion Bright Bar: CS ($J = 1-0$) and H51 α Emission. *T. Omodaka, M. Hayashi, and T. Hasegawa*. **282**, 177, 85-C9 (1984)
- Detection of Shocked Atomic Gas in the Kleinmann-Low Nebula. *M. W. Werner, M. K. Crawford, R. Genzel, D. J. Hollenbach, C. H. Townes, and Dan M. Watson*. **282**, 181, 85-C12 (1984)
- The $v = 0 \rightarrow 0$ Spectrum of H₂. *D. E. Jennings, S. L. Bragg, and J. W. Brault*. **282**, 185, 85-D2 (1984)
- 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. *T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann*. **283**, 106, 87-B13 (1984)
- CS around Orion-KL: A Large Rotating Disk. *Tetsuo Hasegawa, Norio Kaifu, Junji Inatani, Masaki Morimoto, Yoshihiro Chikada, Hisashi Hirabayashi, Hiroyuki Iwashita, Koh-ichiro Morita, Arata Tojo, and Kenji Akabane*. **283**, 117, 87-C10 (1984)
- Interaction of the Outflow and Quiescent Gas in Orion: HCO⁺ Aperture Synthesis Maps. *S. N. Vogel, M. C. H. Wright, R. L. Plambeck, and W. J. Welch*. **283**, 655, 94-B2 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. *C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L.*

- Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- On the Interpretation of the Broad-Band Millimeter-Wave Flux from Orion. E. C. Sutton, Geoffrey A. Blake, C. R. Masson, and T. G. Phillips. **283**, L41, 97-B4 (1984)
- Detection of Submillimeter Polarization in the Orion Nebula. R. H. Hildebrand, M. Dragoan, and G. Novak. **284**, L51, 109-C7 (1984)
- The Methyl Cyanide Hot and Warm Cores in Orion: Statistical Equilibrium Excitation Models of a Symmetric-Top Molecule. Robert B. Loren and Lee G. Mundy. **286**, 232, 124-D10 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130–200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira. **287**, 359, 136-G7 (1984)
- The H51 α Emission Associated with the Shocked Gas in Orion-KL. T. Hasegawa and K. Akabane. **287**, L91, 145-E14 (1984)
- Nebulae: Planetary**
- Radio Structure of the Proto-Planetary Nebula GL 618. Sun Kwok and R. C. Bignell. **276**, 544, 7-E1 (1984)
- Ionized Magnesium in the Planetary Nebula NGC 7027. S. Beckwith, Neal J. Evans II, A. Natta, R. W. Russell, and J. Wyant. **277**, 207, 13-B13 (1984)
- The Pulsating Central Star of the Planetary Nebula Kohoutek 1-16. Albert D. Grauer and Howard E. Bond. **277**, 211, 13-C3 (1984)
- On the Frequency of Planetary Nebula Nuclei Powered by Helium Burning and on the Frequency of White Dwarfs with Hydrogen-deficient Atmospheres. Icko Iben, Jr. **277**, 333, 14-E4 (1984)
- The Remarkable Ultraviolet Spectrum of the Planetary Nebula Abell 30. J. Patrick Harrington and Walter A. Feibelman. **277**, 716, 20-A1 (1984)
- The O VI Nucleus of the Planetary Nebula M3-30. James B. Kaler and Richard A. Shaw. **278**, 195, 26-B6 (1984)
- Chemical Abundances in a New Halo Planetary Nebula. Timothy Barker and Kyle M. Cudworth. **278**, 610, 32-E8 (1984)
- An Infrared Spatial Study of the Planetary Nebula BD + 30°3639. A. F. Bentley, J. A. Hackwell, G. L. Grassdale, and R. D. Gehrz. **278**, 665, 33-B14 (1984)
- IRAS Spectra of Planetary Nebulae. S. R. Pottasch, D. A. Beintema, E. Raimond, B. Baud, R. van Duinen, H. J. Habing, J. R. Houck, T. de Jong, R. E. Jennings, F. M. Olon, and P. R. Wesselius. **278**, L33, 29-E7 (1984)
- Observational Evolution of the Central Stars of Planetary Nebulae. Julius H. Cahn. **279**, 304, 40-C13 (1984)
- High Spatial Resolution Observations of NGC 7027 with a 10 Micron Array Camera. John F. Arens, Gerald M. Lamb, Michael C. Peck, Harvey Moseley, William F. Hoffmann, Richard Tresch-Fienberg, and Giovanni G. Fazio. **279**, 685, 45-C12 (1984)
- Ultraviolet and Optical Spectroscopy of Cn 1-1 (= HDE 330036). Julie H. Lutz. **279**, 714, 45-E13 (1984)
- Helium I λ 10830 Line Strengths in Planetary Nebulae. J. Norman Scrimgeur. **280**, 170, 50-G7 (1984)
- The Close Binary Central Star of the Planetary Nebula Abell 41: A Helium-rich Subdwarf Primary. Richard F. Green, James Liebert, and F. Wesemael. **280**, 177, 51-A1 (1984)
- Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes. **280**, 615, 56-E7 (1984)
- Evidence for an Infrared Disk in the Core of the Extraordinary Planetary Nebula Abell 30. Harriet L. Dinerstein and Daniel F. Lester. **281**, 702, 70-B11 (1984)
- Detection of the [Ne III] 36 Micron Line in the Planetary Nebula NGC 6543. M. A. Shure, J. R. Houck, G. E. Gull, and T. Herter. **281**, L29, 65-G1 (1984)
- An Infrared Disk at the Center of the Bipolar Planetary Nebula NGC 6302. Daniel F. Lester and Harriet L. Dinerstein. **281**, L67, 73-B2 (1984)
- The Central Star of the Planetary Nebula Abell 78. James B. Kaler and Walter A. Feibelman. **282**, 719, 83-A1 (1984)
- [O II] Studies of Galactic Planetary Nebulae and Extragalactic H II Complexes. C. R. O'Dell and Hector O. Castañeda. **283**, 158, 87-F14 (1984)
- The Dust Content of the Planetary Nebula IC 3568. Martin Cohen, J. Patrick Harrington, and Rhys Hess. **283**, 687, 94-D9 (1984)
- The Ionization Structure of Planetary Nebulae. IV. NGC 6853. Timothy Barker. **284**, 589, 105-E2 (1984)
- Mass Loss from Red Giants: A Simple Evolutionary Model for NGC 7027. M. Jura. **286**, 630, 130-A14 (1984)
- The Unique Planetary Nebula NGC 2818. Reginald J. Dufour. **287**, 341, 136-F3 (1984)
- IUE Observations of the "Butterfly" Nebula M2-9. Walter A. Feibelman. **287**, 353, 136-G1 (1984)
- On Bowen Enhancement of the N III Spectrum under Solar and Nebulae Conditions. S. O. Kastner and A. K. Bhatia. **287**, 945, 144-E4 (1984)
- Nebulae: Reflection**
- The Near-Infrared Continuum Emission of Visual Reflection Nebulae. K. Sellgren. **277**, 623, 18-G4 (1984)
- Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. Paul M. Harvey, Bruce A. Wilking, and Marshall Joy. **278**, 156, 25-F8 (1984)
- Bipolar Reflection Nebulae: Monte Carlo Simulations. F. Yusef-Zadeh, Mark Morris, and Richard L. White. **278**, 186, 26-A11 (1984)
- Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. Irene Cruz-Gonzalez, B. McBreen, and G. G. Fazio. **279**, 679, 45-C6 (1984)
- The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. S. Beckwith, S. C. Beck, and I. Gatley. **280**, 648, 57-A1 (1984)
- Photometric Study of NGC 2023 in the 3500 Å to 10000 Å Region: Confirmation of a Near-IR Emission Process in Reflection Nebulae. Adolf N. Witt, Rudolph E. Schild, and James B. Kraman. **281**, 708, 70-C3 (1984)
- High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto. **282**, L69, 85-C3 (1984)
- The Reflection Nebula NGC 1999. Jason A. Cardelli and K. H. Böhm. **285**, 613, 118-C2 (1984)
- Nebulae: Supernova Remnants**
- Radiative Shock-Wave Theory. I. Chemical Abundance Diagnostics and Galactic Abundance Gradients. Michael A. Dopita, Luc Binette, Sandro D'Odorico, and Piero Benvenuti. **276**, 653, 8-F2 (1984)
- An X-Ray Study of the Remnant of SN 185 A.D. Ryszard L. Pisarski, David J. Helfand, and Steven M. Kahn. **277**, 710, 19-G7 (1984)
- Coronal [Fe] Lines in Supernova Remnants: Nonequilibrium Ionization Models. Richard G. Teske. **277**, 832, 21-B13 (1984)
- Einstein Observations of the Cygnus Loop. William H.-M. Ku, Steven M. Kahn, Ryszard Pisarski, and Knox S. Long. **278**, 615, 32-E13 (1984)
- Near-Infrared Spectrophotometry of Crab Nebula Filaments. Richard B. C. Henry, Gordon M. MacAlpine, and Robert P. Kirshner. **278**, 619, 32-F8 (1984)
- Evolution of Pulsar-driven Supernova Remnants. S. P. Reynolds and R. A. Chevalier. **278**, 630, 32-G7 (1984)
- High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. Edward B. Jenkins, George Wallerstein, and Joseph Silk. **278**, 649, 33-A12 (1984)
- A Search for Young, Luminous Optical Pulsars in Extragalactic Supernova Remnants. John Middleditch and Jerome Kristian. **279**, 157, 38-F5 (1984)
- Far-Infrared Sources in the Vicinity of the Supernova Remnant W28. S. F. Odenwald, K. Shivanandan, G. G. Fazio, T. N. Rengarajan, B. McBreen, M. F. Campbell, and H. Moseley. **279**, 162, 38-F11 (1984)
- X-Rays from the SNR 3C 391. Z. R. Wang and F. D. Seward. **279**, 705, 45-E4 (1984)
- Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull. **279**, 708, 45-E7 (1984)
- A Search for X-Ray Polarization in Cosmic X-Ray Sources. John P. Hughes, Knox S. Long, and Robert Novick. **280**, 255, 51-G2 (1984)
- The Interaction of Crab-like Supernova Remnants with Their Surroundings. Roger A. Chevalier. **280**, 797, 58-E5 (1984)
- The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. Joseph E. Borowsky, Morris B. Pongratz, Robert A. Roussel-Dupré, and Tai-Ho Tan. **280**, 802, 58-E10 (1984)
- The Expansion Age of the Supernova Remnant RCW 89 = MSH 15 - 52 (G320.4 - 1.2). Sidney van den Bergh and Karl W. Kamper. **280**, L51, 60-E1 (1984)
- Nonequilibrium Analysis of Supernova Remnants in the Large Magellanic Cloud. R. Fusco-Femiano and A. Preite-Martinez. **281**, 593, 69-A13 (1984)
- The Unusual Nickel/Iron Abundance Ratio in the Crab Nebula Filaments. Richard B. C. Henry. **281**, 644, 69-E8 (1984)
- The X-Ray Nebula around PSR 1509 - 58. F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank. **281**, 650, 69-E14 (1984)
- The Nature of the Filaments Northeast of the Supernova Remnant IC 443. Robert A. Fesen. **281**, 658, 69-F8 (1984)
- On the X-Ray Emission from Crab-like Supernova Remnants. Stephen P. Reynolds and Gary A. Chanan. **281**, 673, 69-G10 (1984)
- A New Similarity Solution for Reverse Shocks in Supernova Remnants. A. J. S. Hamilton and C. L. Sarazin. **281**, 682, 70-A5 (1984)
- Thermal Evaporation of Spherical Clouds: Effects of Viscous Stresses. B. T. Draine and J. L. Giuliani, Jr. **281**, 690, 70-A13 (1984)

Nebulae: Supernova Remnants—Continued

- Interpretation of the Number versus Diameter Distribution for Supernova Remnants in the Large Magellanic Cloud. *John P. Hughes, David J. Helfand, and Steven M. Kahn*. **281**, L25, 65-F11 (1984)
- A Probable Supernova Remnant in the Dwarf Elliptical Galaxy NGC 185. *John S. Gallagher III, Deidre A. Hunter, and Jeremy Mould*. **281**, L63, 73-A12 (1984)
- Spectrophotometry of Young Supernova Remnants. *Michael A. Dopita and Ian R. Tuohy*. **282**, 135, 75-D7 (1984)
- Radiative Shock Wave Theory. III. The Nature of the Optical Emission in Young Supernova Remnants. *Michael A. Dopita, Luc Binette, and Ian R. Tuohy*. **282**, 142, 75-D14 (1984)
- Magnetically Ordered Jets from Pulsars. *Gregory Benford*. **282**, 154, 75-E13 (1984)
- An Optical Investigation of the Peculiar Supernova Remnant CTB 80. *William P. Blair, Robert P. Kirshner, Robert A. Fesen, and Theodore R. Gull*. **282**, 161, 75-F6 (1984)
- Extended Radio Observations of the SNR CTB 109. *V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner*. **283**, 147, 87-F1 (1984)
- New Radio Observations of the Composite Supernova Remnant G29.7 - 0.3. *R. H. Becker and D. J. Helfand*. **283**, 154, 87-F9 (1984)
- Confinement of the Crab Pulsar's Wind by Its Supernova Remnant. *C. F. Kennel and F. V. Coroniti*. **283**, 694, 94-E2 (1984)
- Scattering of Shock Waves by a Spherical Cloud. *Satoru Ikeuchi and Lyman Spitzer, Jr.*. **283**, 825, 96-A1 (1984)
- The Time Development of a Blast Wave with Shock-heated Electrons. *Richard J. Edgar and Donald P. Cox*. **283**, 833, 96-A9 (1984)
- X-Ray Emission from Supernova Remnants. II. The Effect of Remnant Structure on Nonequilibrium X-Ray Spectra. *A. J. S. Hamilton and C. L. Sarazin*. **284**, 601, 105-F2 (1984)
- X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. *John J. Nugent, Steven H. Pravdo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler*. **284**, 612, 105-F13 (1984)
- The Evolution of Nonthermal Supernova Remnants. II. Can Radio Supernovae Become Plerions? *R. Bandiera, F. Pacini, and M. Salvati*. **285**, 134, 111-D6 (1984)
- Explosive Nucleosynthesis in Massive Stars: Comparison with the Cassiopeia A Fast-moving Knots. *M. D. Johnston and A. Yahil*. **285**, 587, 118-A4 (1984)
- Temperature Relaxation in Supernova Remnants, Revisited. *Hiroshi Itoh*. **285**, 601, 118-C7 (1984)
- An X-Ray Investigation of the Unusual Supernova Remnant CTB 80. *Z. R. Wang and F. D. Seward*. **285**, 607, 118-B10 (1984)
- The Kinematics of the Crab Nebula's Jet. *Peter Shull, Jr., Uri Carsenty, Michael Sarcander, and Thorsten Neckel*. **285**, L75, 121-F9 (1984)
- Very High Resolution Observations of Compact Sources in the Direction of Supernova Remnants: G74.87 + 1.22. *Barry J. Geldzahler, David B. Shaffer, and Helmut Kühr*. **286**, 284, 125-A9 (1984)
- Heating and Cooling in Reverse Shocks into Pure Heavy-Element Supernova Ejecta. *A. J. S. Hamilton and C. L. Sarazin*. **287**, 282, 136-A10 (1984)
- A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. *Y. Matsui, Knox S. Long, John R. Dickel, and Eric W. Greisen*. **287**, 295, 136-B9 (1984)
- Discovery of a 50 Millisecond Pulsar in the Large Magellanic Cloud. *F. D. Seward, F. R. Harnden, Jr., and David J. Helfand*. **287**, L19, 138-D5 (1984)
- An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 - 693 in the Large Magellanic Cloud. *Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds*. **287**, L23, 138-D9 (1984)
- Supernova Remnants in the Magellanic Clouds. *D. S. Mathewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle*. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- H I Shells, Supershells, Shell-like Objects, and "Worms". *Carl Heiles*. **55**, 585, 19-D1 (1984) (Abstr. in **282**, 821, 84-A11)
- Neutrinos**
- Neutrino Emissivity of Interacting Quark Matter in Neutron Stars. II. Finite Neutrino Momentum Effects. *Robert C. Duncan, Stuart L. Shapiro, and Ira Wasserman*. **278**, 806, 34-F6 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. *Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama*. **279**, 413, 41-D10 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections in the Liquid Metal Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **280**, 787, 58-D9 (1984)
- Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. *W. Y. Chau, Kayll Lake, and J. Stone*. **281**, 560, 68-F2 (1984)
- Limits on Astrophysical ν_e Flux at $E_\nu > 10^{19}$ eV. *R. Baltrusaitis, R. Cady, G. Cassiday, J. W. Elbert, P. Gerhardt, E. Loh, Y. Mizumoto, P. Sokolsky, and D. Steck*. **281**, L9, 65-E10 (1984)
- Massive Neutrinos and the Pancake Theory of Galaxy Formation. *Richard Schaeffer and Joseph Silk*. **281**, L13, 65-E14 (1984)
- Firm Bounds on the Neutrino Mass from the Distribution of Dark Matter in Galaxies. *Jes Madsen and Richard I. Epstein*. **282**, 11, 74-B2 (1984)
- Detection of Massive Cosmic Neutrinos by Second-Order in G Coherent Scattering. *R. Opher*. **282**, 398, 79-D2 (1984)
- On Detecting Stellar Collapse with Neutrinos. *Adam Burrows*. **283**, 848, 96-B11 (1984)
- The Production of Very High Energy Photons and Neutrinos from Cosmic Proton Sources. *V. J. Stenger*. **284**, 810, 107-F7 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 304, 113-C2 (1984)
- Big Bang Cosmology, Relic Neutrinos, and Absorption of Neutrino Cosmic Rays. *T. Weiler*. **285**, 495, 116-G12 (1984)
- Electron Capture Supernovae: One-Zone Collapse Calculation for Stars with Masses $10 M_\odot$ and $15 M_\odot$. *A. Ray, S. M. Chitre, and K. Kar*. **285**, 766, 119-G6 (1984)
- Notices**
- The Astrophysical Journal Instructions to Authors. *APJ Staff*. **276**, 1, 5-B11 (1984)
- In Memoriam Jeanne Hopkins. *Helmut A. Abt*. **286**, 1, 122-A6 (1984)
- Nuclear Reactions**
- On the Thermonuclear Origin of the Gamma-Rays from SS 433. *R. N. Boyd, M. Wiescher, G. H. Newsom, and G. W. Collins II*. **276**, L9, 5-E9 (1984)
- Screening Potential Enhancement of Thermonuclear Reaction Rate due to Relativistic Degenerate Electrons in Dense Multi-ionic Plasmas. *Seisuo Ichimaru and Kenichi Utsumi*. **278**, 382, 28-B5 (1984)
- The Effect of Inelastic Neutron Acceleration by Isomeric Nuclei on the s-Process Nucleosynthesis. *Yu. V. Petrov and A. I. Shlyakhter*. **278**, 385, 28-B8 (1984)
- The s-Process Branching at ^{151}Sm . *H. Beer, F. Käppeler, K. Yokoi, and K. Takahashi*. **278**, 388, 28-B11 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections in the Liquid Metal Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **280**, 787, 58-D9 (1984)
- On the Half-Life of ^{180}Ta in Stellar Environments. *Eric B. Norman, Stephen E. Kellogg, Timothy Bertram, Salvador Gil, and Peter Wong*. **281**, 360, 64-G8 (1984)
- Bound-State Decay of Rhenium-187. *R. D. Williams, W. A. Fowler, and S. E. Koonin*. **281**, 363, 64-G11 (1984)
- Nuclear Processes in the Jets of SS 433. *R. Ramaty, B. Kozlovsky, and R. E. Lingenfelter*. **283**, L13, 91-F1 (1984)
- On the Bizarre Gamma-Ray Spectrum of SS 433. *H. L. Helfer and M. P. Savedoff*. **283**, L49, 97-B12 (1984)
- Enhancement of Thermonuclear Reaction Rate due to Screening by Relativistic Degenerate Electrons: Long-Range Correlation Effect. *Seisuo Ichimaru and Kenichi Utsumi*. **286**, 363, 125-G6 (1984)
- Neutron Capture Nucleosynthesis of Neodymium Isotopes and the s-Process from $A = 130$ to 150 . *G. J. Mathews and F. Käppeler*. **286**, 180, 132-A1 (1984)
- The $^{13}\text{N}(p,\gamma)^{14}\text{O}$ Thermonuclear Reaction Rate and the Hot CNO Cycle. *G. J. Mathews and F. S. Dietrich*. **287**, 969, 144-G1 (1984)
- Nucleosynthesis**
- On the Composition of the Stellar Winds of the Most Massive Stars: $100 M_\odot$ to $2200 M_\odot$. *D. S. P. Dearborn and J. B. Blake*. **277**, 783, 20-F3 (1984)
- Evolution of 8-10 M_\odot Stars toward Electron Capture Supernovae. I. Formation of Electron-Degenerate O + Ne + Mg Cores. *Ken'ichi Nomoto*. **277**, 791, 20-F11 (1984)
- The Effect of Inelastic Neutron Acceleration by Isomeric Nuclei on the s-Process Nucleosynthesis. *Yu. V. Petrov and A. I. Shlyakhter*. **278**, 385, 28-B8 (1984)
- The s-Process Branching at ^{151}Sm . *H. Beer, F. Käppeler, K. Yokoi, and K. Takahashi*. **278**, 388, 28-B11 (1984)
- On the Abundances of Ultraheavy Cosmic Rays. *John R. Letaw, Rein Silberberg, and C. H. Tsao*. **279**, 144, 38-E6 (1984)
- p-Process Nucleosynthesis and the Abundances of the Minor Isotopes of Tin. *J. R. De Laeter, K. J. R. Rosman, and R. D. Loss*. **279**, 814, 46-F4 (1984)
- Explosive Nucleosynthesis of Type I Supernovae. *K. Nomoto, F.-K. Thielemann, and J. C. Wheeler*. **279**, L23, 42-E9 (1984)
- ^{26}Al in the Interstellar Medium. *Donald D. Clayton*. **280**, 144, 50-E8 (1984)

- Diffusion-induced Hydrogen Burning in Helium-rich White Dwarfs. *G. Michaud, G. Fontaine, and Y. Charland.* **280**, 247, 51-F8 (1984)
- Models for Type I Supernovae: Partially Incinerated White Dwarfs. *Peter G. Sutherland and J. Craig Wheeler.* **280**, 282, 52-B2 (1984)
- On the Half-Life of ^{180}Ta in Stellar Environments. *Eric B. Norman, Stephen E. Kellogg, Timothy Bertram, Salvador Gil, and Peter Wong.* **281**, 360, 64-G8 (1984)
- Bound-State Decay of Rhenium-187. *R. D. Williams, W. A. Fowler, and S. E. Koonin.* **281**, 363, 64-G11 (1984)
- The Effect of Diffusion on Pre-nova Evolution: CNO-enriched Envelopes. *Dina Prialnik and Attay Kovetz.* **281**, 367, 65-A1 (1984)
- Primordial Nucleosynthesis: A Critical Comparison of Theory and Observation. *J. Yang, M. S. Turner, G. Steigman, D. N. Schramm, and K. A. Olive.* **281**, 493, 68-A5 (1984)
- Oxygen Isotopes in the Atmospheres of Betelgeuse and Antares. *Michael J. Harris and David L. Lambert.* **281**, 739, 70-E9 (1984)
- Lithium in Late-Type Giants. III. The Weak G Band Giants. *David L. Lambert and Scott R. Sawyer.* **283**, 192, 88-B6 (1984)
- On the Production of Technetium in Thermally Pulsing Red Giant Stars. *Kenneth R. Cosner, Keith H. Despain, and James W. Truran.* **283**, 313, 89-D7 (1984)
- Explosive Nucleosynthesis and Type I Supernovae: Erratum. *K. Nomoto, F.-K. Thielemann, and J. C. Wheeler.* **283**, L25, 91-F12 (1984) (Orig. paper in **279**, L23, 42-E9)
- Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. *David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson.* **283**, 223, 100-D14 (1984)
- Galactic Chemical Evolution and Nucleocosmochronology: Standard Model with Terminated Infall. *Donald D. Clayton.* **285**, 411, 116-A5 (1984)
- The Ultra-Metal-deficient (Population III?) Red Giant CD $-38^\circ 245$. *M. S. Bessell and John Norris.* **285**, 622, 118-C11 (1984)
- Oxygen Isotopic Abundances in the Atmospheres of Seven Red Giant Stars. *Michael J. Harris and David L. Lambert.* **285**, 674, 118-G7 (1984)
- Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. *Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi.* **286**, 644, 130-B14 (1984)
- Neutron Capture Nucleosynthesis of Neodymium Isotopes and the s -Process from $A = 130$ to 150 . *G. J. Mathews and F. Käppeler.* **286**, 810, 132-A1 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. *Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè.* **287**, 749, 142-D14 (1984)
- The $^{13}\text{N}(p,\gamma)^{14}\text{O}$ Thermonuclear Reaction Rate and the Hot CNO Cycle. *G. J. Mathews and F. S. Dietrich.* **287**, 969, 144-G1 (1984)
- The Chemical Composition and Evolutionary State of the Early R Stars. *James F. Dominy.* **55**, 27, 11-C1 (1984) (Abstr. in **279**, 909, 47-F14)
- Numerical Methods**
- The Self-consistent Response of Stellar Disks to Bar Forcing. *K. O. Thielheim and H. Wolff.* **276**, 135, 2-D2 (1984)
- N -Body Simulations of Small Groups of Galaxies. *G. Giuricin, F. Mardirossian, M. Mezzetti, and P. Santangelo.* **277**, 38, 11-D1 (1984)
- A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. *John F. Hawley, Larry L. Smarr, and James R. Wilson.* **277**, 296, 14-B9 (1984)
- On the Formation and Dynamics of Shells around Elliptical Galaxies. *P. J. Quinn.* **279**, 596, 44-C14 (1984)
- Dissipationless Collapse of Galaxies and Initial Conditions. *Thomas A. McGlynn.* **281**, 13, 61-B4 (1984)
- Techniques for the Estimation of Red Power Spectra. II. Evaluation of Alternative Methods. *J. E. Deeter.* **281**, 482, 65-B11 (1984)
- Two- and Three-Dimensional Numerical Simulations of the Core Helium Flash. *Robert G. Deupree.* **282**, 274, 76-G8 (1984)
- A Unified N -Body and Statistical Treatment of Stellar Dynamics. I. The Hybrid Code. *Stephen L. W. McMillan and Alan P. Lightman.* **283**, 801, 95-F3 (1984)
- A Unified N -Body and Statistical Treatment of Stellar Dynamics. II. Applications to Globular Cluster Cores. *Stephen L. W. McMillan and Alan P. Lightman.* **283**, 813, 95-G1 (1984)
- Violent Relaxation and Dissipationless Collapse. *Jens Verner Villumsen.* **284**, 75, 98-F11 (1984)
- Globular Cluster Swapping in Clusters of Galaxies. *J. C. Muzzio, R. E. Martinez, and M. Rabotti.* **285**, 7, 110-A12 (1984)
- On the Characteristics of Clusters of Galaxies with Unseen Mass. *Haywood Smith, Jr.* **285**, 16, 110-B7 (1984)
- The Formation and Early Dynamical Evolution of Bound Stellar Systems. *Charles J. Lada, Michael Margulis, and David Dearborn.* **285**, 141, 111-D14 (1984)
- Angular Momentum Growth in Protogalaxies. *Simon D. M. White.* **286**, 38, 122-C14 (1984)
- Gravitational Spurs and Resonances: Effects of Small Mass Disturbances in Spiral Galaxy Disks. *Gene G. Byrd, Bruce F. Smith, and Richard H. Miller.* **286**, 62, 122-E10 (1984)
- Dissipative Formation of an Elliptical Galaxy. *R. G. Carlberg.* **286**, 403, 127-D11 (1984)
- Dissipative Models for the Sequence of Elliptical Galaxies. *R. G. Carlberg.* **286**, 416, 127-E12 (1984)
- A Light Synthesis Program for Binary Stars. I. *Albert P. Linnell.* **54**, 17, 1-B3 (1984) (Abstr. in **275**, 926, 147-E13)
- Hard Binary-Single Star Scattering Cross Sections for Equal Masses. *Piet Hut.* **55**, 301, 15-B1 (1984) (Abstr. in **280**, 940, 60-B4)
- Occultations**
- The Helium Abundance of Saturn from *Voyager* Measurements. *B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein.* **282**, 807, 83-G8 (1984)
- A Radio Source Occultation Experiment with Comet Austin 1982g, with Unusual Results. *Imke de Pater and Wing-H. Ip.* **283**, 895, 96-F2 (1984)
- Opacities**
- Models of Lower-Main-Sequence Stars. *Gerald D. Neece.* **277**, 738, 20-B10 (1984)
- The Influence of Electron Scattering on the He II Line Profiles of HD 50896. *D. J. Hillier.* **280**, 744, 58-A1 (1984)
- Opacities for Comptonization Plus Emission and Absorption. *Martin A. Schweizer.* **280**, 809, 58-F3 (1984)
- IUE* Observations of High-Redshift Quasars. *Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman.* **281**, 76, 61-F12 (1984)
- Is the Metal Contribution to the Astrophysical Opacity Incorrect? *N. H. Magee, Jr., A. L. Merts, and W. F. Huebner.* **283**, 264, 88-G10 (1984)
- Discrepancy in the CNO Opacity Bump Resolved. *T. R. Carson, W. F. Huebner, N. H. Magee, Jr., and A. L. Merts.* **283**, 466, 91-B7 (1984)
- Optical Properties of Interstellar Graphite and Silicate Grains. *B. T. Draine and Hyung Mok Lee.* **285**, 89, 111-A3 (1984)
- Consequences of a Chromospheric Temperature Gradient on the Width of H α in Late-Type Giants. *D. M. Zarro.* **285**, 232, 112-D11 (1984)
- Soft X-Ray Opacity in Hot and Photoionized Gases. *Julian H. Krolik and Timothy R. Kallman.* **286**, 366, 125-G9 (1984)
- Relativistic Electron Transport in a Quantizing Magnetic Field. *Lars Hernquist.* **56**, 325, 27-C7 (1984) (Abstr. in **285**, 875, 121-A6)
- Particle Acceleration**
- A Study of the Evolution of Energetic Electrons in a Solar Flare. *Gordon D. Holman, M. R. Kundu, and B. R. Dennis.* **276**, 761, 9-G1 (1984)
- Stimulated Compton Scattering of Hydromagnetic Waves in the Interstellar Medium. *Padma K. Shukla and John M. Dawson.* **276**, L49, 10-F7 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley.* **277**, 82, 11-G5 (1984)
- The Electron Energy Spectrum Produced in Radio Sources by Turbulent, Resonant Acceleration. *Jean A. Eilek and Richard N. Henriksen.* **277**, 820, 21-B1 (1984)
- The Effect of Convection upon Charged Particle Transport in Random Magnetic Fields. *James A. Earl.* **278**, 825, 34-G11 (1984)
- The Energy Spectrum of Electrons and Cosmic-Ray Confinement: A New Measurement and Its Interpretation. *K.-K. Tang.* **278**, 881, 35-D13 (1984)
- Alternating-Side Ejection in Extragalactic Radio Sources. *L. Rudnick and B. K. Edgar.* **279**, 74, 37-G2 (1984)
- The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. *M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis.* **279**, 875, 47-D3 (1984)
- Microwave Signature of Thick-Target Electron Beams in Solar Flares. *A. Gordon Emslie and Dean F. Smith.* **279**, 882, 47-D10 (1984)
- The Scattering of Energetic Particles by Waves in a Finite β Plasma. *Joseph M. Davila and John S. Scott.* **280**, 334, 52-E12 (1984)
- Alfvén Waves in the Solar Wind in Association with Solar Energetic Particles: Sunspot Umbra Origin? *D. J. Mullan and A. J. Owens.* **280**, 346, 52-E10 (1984)
- The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. *William K. Rose, John Guillory, James H. Beall, and Selig Kainer.* **280**, 550, 55-G8 (1984)
- Temporal Variations of Nucleonic Abundances in Solar Flare Energetic

Particle Acceleration—Continued

- Particle Events. II. Evidence for Large-Scale Shock Acceleration. G. M. Mason, G. Gloeckler, and D. Hovestadt. **280**, 902, 59-E14 (1984)
- Turbulent Heating in Solar Cosmic-Ray Theory. James Weatherall. **281**, 468, 66-A11 (1984)
- On the X-Ray Emission from Crab-like Supernova Remnants. Stephen P. Reynolds and Gary A. Chanan. **281**, 673, 69-G10 (1984)
- Type II Solar Radio Bursts, Interplanetary Shocks, and Energetic Particle Events. H. V. Cane and R. G. Stone. **282**, 339, 77-E4 (1984)
- Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest. **283**, 439, 90-G5 (1984)
- Nuclear Processes in the Jets of SS 433. R. Ramaty, B. Kozlovsky, and R. E. Lingenfelter. **283**, L13, 91-F1 (1984)
- Importance of Transverse Diffusion for Cosmic-Ray Propagation. P. Barge, J. Millet, and R. Pellat. **284**, 817, 108-A1 (1984)
- The Interplanetary Scattering Mean Free Path: Collisionless Wave-damping Effects. Joseph M. Davila and John S. Scott. **285**, 400, 114-C5 (1984)
- Monte Carlo Shock-like Solutions to the Boltzmann Equation with Collective Scattering. Donald C. Ellison and David Eichler. **286**, 691, 130-F5 (1984)
- Numerical Investigation of Fluid Models with Full Electron and Proton Thermal Conduction Equations for the Quiet Solar Wind. S. Cuperman, I. Tzur, and M. Dryer. **286**, 763, 131-D10 (1984)
- Ejection of Atoms and Molecules from Io by Plasma-Ion Impact. E. M. Sieveka and R. E. Johnson. **287**, 418, 137-D12 (1984)
- Io's Sodium Directional Features: Evidence for a Magnetospheric-Wind-driven Gas Escape Mechanism. C. B. Pilcher, W. H. Smyth, M. R. Combi, and J. H. Fertel. **287**, 427, 137-E7 (1984)
- Propagation of Heavy Cosmic-Ray Nuclei. John R. Letaw, Rein Silberberg, and C. H. Tsao. **56**, 369, 27-F9 (1984) (Abstr. in **285**, 875, 121-A6)
- Photometry**
- The Distance to IC 1613 from Infrared Photometry of Cepheids. Christopher W. McAlary, Barry F. Madore, and Lindsey E. Davis. **276**, 487, 6-G10 (1984)
- CCD Brightness Monitoring of the Twin QSO 0957 + 561. R. E. Schild and T. Weekes. **277**, 481, 17-C13 (1984)
- Far-Infrared and Submillimeter Observations of the Low-Luminosity Protostars L1455 FIR and L1551 IRS 5: The Confinement of Bipolar Outflows. J. A. Davidson and D. T. Jaffe. **277**, L13, 16-A13 (1984)
- Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray. **278**, 224, 26-D8 (1984)
- Narrow-Band Infrared Photometry of the Peculiar White Dwarf LHS 1126. M. J. Lebofsky and James Liebert. **278**, L111, 36-B13 (1984)
- Broad-Band Photometry of Extreme Helium Stars. J. S. Drilling, A. U. Landolt, and D. Schönberner. **279**, 748, 46-A7 (1984)
- Optical and Infrared Photometry of Late-Type Stars in the Pleiades. John R. Stauffer. **280**, 189, 51-B3 (1984)
- Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi. **280**, 213, 51-D1 (1984)
- Color-Magnitude Photometry for the Globular Cluster NGC 288. Edward W. Olszewski, R. Canerna, and William E. Harris. **281**, 158, 62-E13 (1984)
- The Ratio of Total to Selective Extinction in the Chamaeleon TI and R Coronae Australis Dark Clouds. F. J. Vrba and A. E. Rydgren. **283**, 123, 87-D2 (1984)
- Color-Magnitude Diagram Photometry of the LMC Red Cluster NGC 1978. Edward W. Olszewski. **284**, 108, 99-B11 (1984)
- Spectroscopic Tests of Photoelectric Stellar Classification of Abnormal Stars. Helmut A. Abt. **285**, 247, 112-E12 (1984)
- Main-Sequence Photometry of the SMC Globular Cluster Kron 3. R. M. Rich, G. S. Da Costa, and J. R. Mould. **286**, 517, 128-G1 (1984)
- JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. McAlary, R. McGonegal, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- Photometric Parallaxes for Selected Stars of Color Class m from the NLTT Catalog. Edward W. Weis. **55**, 289, 15-A3 (1984) (Abstr. in **280**, 940, 60-B4)
- Observational Studies of Cepheids. II. BVRI Photometry of 112 Cepheids. Thomas J. Moffett and Thomas G. Barnes III. **55**, 389, 16-B10 (1984) (Abstr. in **281**, 890, 72-C3)
- Yellow Giants in Young Clusters. I. Photometric Observations. Edward G. Schmidt. **55**, 455, 17-B8 (1984) (Abstr. in **281**, 891, 72-C4)
- A Study of the O'Connell Effect in the Light Curves of Eclipsing Binaries. T. J. Davidge and E. F. Milone. **55**, 571, 19-C1 (1984) (Abstr. in **282**, 820, 84-A10)

The A0 Stars. Olin J. Eggen. **55**, 597, 20-A1 (1984) (Abstr. in **282**, 821, 84-A11)

Close Visual Binaries. I. ML Classifications. Christopher J. Corbally. **55**, 657, 20-E8 (1984) (Abstr. in **282**, 822, 84-A12)

A Deep Photometric Study of IC 5146. Juan C. Forte and Ana M. Orsatti. **56**, 211, 25-B13 (1984) (Abstr. in **284**, 869, 108-E1)

The A0 Stars: Erratum. Olin J. Eggen. **56**, 650, 33-C3 (1984) (Orig. paper in **55**, 597, 20-A1)

Planets: Abundances

The Helium Abundance of Saturn from Voyager Measurements. B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein. **282**, 807, 83-G8 (1984)

The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager Iris Spectra: NH_3 , PH_3 , C_2H_2 , C_2H_6 , CH_3D , CH_4 , and the Saturnian D/H Isotopic Ratio. R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel. **287**, 899, 144-A14 (1984)

Photochemistry of the Atmosphere of Titan: Comparison between Model and Observations. Yuk L. Yung, Mark Allen, and Joseph P. Pinto. **55**, 465, 17-C3 (1984) (Abstr. in **281**, 892, 72-C5)

Planets: Atmospheres

The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from Voyager Iris Spectra: NH_3 , PH_3 , C_2H_2 , C_2H_6 , CH_3D , CH_4 , and the Saturnian D/H Isotopic Ratio. R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel. **287**, 899, 144-A14 (1984)

Photochemistry of the Atmosphere of Titan: Comparison between Model and Observations. Yuk L. Yung, Mark Allen, and Joseph P. Pinto. **55**, 465, 17-C3 (1984) (Abstr. in **281**, 892, 72-C5)

Planets: General

Testing the Strong Equivalence Principle by Radio Ranging. V. M. Canuto, I. Goldman, and I. I. Shapiro. **276**, 1, 1-A6 (1984)

On the Tidal Interaction between Protoplanets and the Primordial Solar Nebula. I. Linear Calculation of the Role of Angular Momentum Exchange. John Papaloizou and D. N. C. Lin. **285**, 818, 120-D4 (1984)

Discovery of Solar System-Size Halos around Young Stars. S. Beckwith, B. Zuckerman, M. F. Skrutskie, and H. M. Dyck. **287**, 793, 143-A2 (1984)

Planets: Interiors

Statistical Mechanics of Light Elements at High Pressure. VI. Liquid-State Calculations with Thomas-Fermi-Dirac Theory. J. J. MacFarlane. **280**, 339, 52-E3 (1984)

Planets: Jupiter

IUE Observations of Longitudinal and Temporal Variations in the Jovian Auroral Emission. T. E. Skinner, S. T. Durrance, P. D. Feldman, and H. W. Moos. **278**, 441, 28-F11 (1984)

High-Resolution Maps of the 1.5 GHz Emission from Jupiter's Disk and Radiation Belt. J. A. Roberts, G. L. Berge, and R. C. Bignell. **282**, 345, 77-E10 (1984)

The Helium Abundance of Saturn from Voyager Measurements. B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein. **282**, 807, 83-G8 (1984)

Hydrogen Dimer Structures in the Far-Infrared Spectra of Jupiter and Saturn. Lothar Frommhold, Robert Samuelson, and George Birnbaum. **283**, L79, 97-D14 (1984)

Collision Strengths for $\lambda 1199$ and $\lambda 1729$ of S III. Y. K. Ho and Ronald J. W. Henry. **284**, 435, 102-F2 (1984)

Very Large Array Observations of Jupiter's Nonthermal Radiation. Imke de Pater and Walter J. Jaffe. **54**, 405, 7-C10 (1984) (Abstr. in **277**, 908, 22-A9)

Planets: Magnetospheres

IUE Observations of Longitudinal and Temporal Variations in the Jovian Auroral Emission. T. E. Skinner, S. T. Durrance, P. D. Feldman, and H. W. Moos. **278**, 441, 28-F11 (1984)

High-Resolution Maps of the 1.5 GHz Emission from Jupiter's Disk and Radiation Belt. J. A. Roberts, G. L. Berge, and R. C. Bignell. **282**, 345, 77-E10 (1984)

Ejection of Atoms and Molecules from Io by Plasma-Ion Impact. E. M. Sieveka and R. E. Johnson. **287**, 418, 137-D12 (1984)

Io's Sodium Directional Features: Evidence for a Magnetospheric-Wind-driven Gas Escape Mechanism. C. B. Pilcher, W. H. Smyth, M. R. Combi, and J. H. Fertel. **287**, 427, 137-E7 (1984)

Planets: Mercury

Gravitation in the Weak-Field Limit. Herbert J. Rood. **284**, 407, 102-D2 (1984)

Planets: Radio Radiation

High-Resolution Maps of the 1.5 GHz Emission from Jupiter's Disk and Radiation Belt. J. A. Roberts, G. L. Berge, and R. C. Bignell. **282**, 345, 77-E10 (1984)

Very Large Array Observations of Jupiter's Nonthermal Radiation. Imke de Pater and Walter J. Jaffe. **54**, 405, 7-C10 (1984) (Abstr. in **277**, 908, 22-A9)

Planets: Satellites

- Excitation of Inclinations in Ring-Satellite Systems. *Nicole Borderies, Peter Goldreich, and Scott Tremaine.* **284**, 429, 102-E10 (1984)
- Collision Strengths for $\Lambda 1199$ and $\Lambda 1729$ of S III. *Y. K. Ho and Ronald J. W. Henry.* **284**, 435, 102-F2 (1984)
- Ejection of Atoms and Molecules from Io by Plasma-Ion Impact. *E. M. Sieveka and R. E. Johnson.* **287**, 418, 137-D12 (1984)
- Io's Sodium Directional Features: Evidence for a Magnetospheric-Wind-driven Gas Escape Mechanism. *C. B. Pilcher, W. H. Smyth, M. R. Combi, and J. H. Fertil.* **287**, 427, 137-E7 (1984)
- Photochemistry of the Atmosphere of Titan: Comparison between Model and Observations. *Yuk L. Yung, Mark Allen, and Joseph P. Pinto.* **55**, 465, 17-C3 (1984) (Abstr. in **281**, 892, 72-C5)

Planets: Saturn

- The Helium Abundance of Saturn from *Voyager* Measurements. *B. J. Conrath, D. Gautier, R. A. Hanel, and J. S. Hornstein.* **282**, 807, 83-G8 (1984)
- Excitation of Inclinations in Ring-Satellite Systems. *Nicole Borderies, Peter Goldreich, and Scott Tremaine.* **284**, 429, 102-E10 (1984)
- The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from *Voyager* Iris Spectra: NH_3 , PH_3 , C_2H_2 , C_2H_6 , CH_3D , CH_4 , and the Saturnian D/H Isotopic Ratio. *R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel.* **287**, 899, 144-A14 (1984)
- Photochemistry of the Atmosphere of Titan: Comparison between Model and Observations. *Yuk L. Yung, Mark Allen, and Joseph P. Pinto.* **55**, 465, 17-C3 (1984) (Abstr. in **281**, 892, 72-C5)

Planets: Spectra

- The Composition of Saturn's Atmosphere at Northern Temperate Latitudes from *Voyager* Iris Spectra: NH_3 , PH_3 , C_2H_2 , C_2H_6 , CH_3D , CH_4 , and the Saturnian D/H Isotopic Ratio. *R. Courtin, D. Gautier, A. Marten, B. Bezard, and R. Hanel.* **287**, 899, 144-A14 (1984)

Planets: Uranus

- Excitation of Inclinations in Ring-Satellite Systems. *Nicole Borderies, Peter Goldreich, and Scott Tremaine.* **284**, 429, 102-E10 (1984)

Plasmas

- MHD Stability of Compressible Coronal Loops with Radiative Energy Loss. *Chang-Hyuk An.* **276**, 352, 4-E12 (1984)
- Radio Emission from the Outer Parts of Stellar Atmospheres (Mantles) at Centimeter Wavelengths and the Winds of Early-Type Stars. *Anne B. Underhill.* **276**, 583, 8-A1 (1984)
- Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. *A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Darbro.* **276**, 691, 9-B1 (1984)
- Stimulated Compton Scattering of Hydromagnetic Waves in the Interstellar Medium. *Padma K. Shukla and John M. Dawson.* **276**, L49, 10-F7 (1984)
- On the Energetics of Slow Magnetic Tearing. *D. N. Arion.* **277**, 841, 21-C8 (1984)
- Polarized Radiation from Hot Plasmas and Applications to AM Herculis Binaries. II. Effect of Collisions and Thomson Scattering. *P. E. Barrett and G. Channugam.* **278**, 298, 27-C2 (1984)
- Screening Potential Enhancement of Thermonuclear Reaction Rate due to Relativistic Degenerate Electrons in Dense Multi-ionic Plasmas. *Settsuo Ichimaru and Kenichi Utsumi.* **278**, 382, 28-B5 (1984)
- The Effects of a Multidensity Plasma on Ultraviolet Spectroscopic Electron Density Diagnostics. *G. A. Doschek.* **279**, 446, 41-G7 (1984)
- Collisional Excitation Rate Coefficients for Fe XI. *Jieh-Shan Wang, Aray Marotta, and Raju U. Datla.* **279**, 460, 42-A8 (1984)
- Microwave Signature of Thick-Target Electron Beams in Solar Flares. *A. Gordon Emslie and Dean F. Smith.* **279**, 882, 47-D10 (1984)
- Electron Density-Dependent Intensity Ratios of Highly Ionized Iron Lines: A Comparison of Theory and Experiment. *B. C. Stratton, H. W. Moos, and M. Finkenthal.* **279**, L31, 42-F3 (1984)
- The Scattering of Energetic Particles by Waves in a Finite β Plasma. *Joseph M. Davila and John S. Scott.* **280**, 334, 52-E12 (1984)
- Beam-Return Current Systems in Solar Flares. *D. S. Spicer and R. N. Sudan.* **280**, 448, 53-G2 (1984)
- The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. *William K. Rose, John Guillery, James H. Beall, and Selig Kainer.* **280**, 550, 55-G8 (1984)
- Wave-Wave Interaction in Magneto-gravitating Plasma. *S. S. Aggarwal and G. L. Kalra.* **280**, 792, 58-D14 (1984)
- Heat Flux Instability in Cometary and Solar Plasma. *G. S. Lakhina and B. Buti.* **280**, 917, 59-G5 (1984)
- Comments on the MHD Stability of Coronal Plasmas with Line-Tying. *Chang-Hyuk An.* **281**, 419, 65-D11 (1984)
- Reheating the Intergalactic Medium under Extremal Conditions. *Richard D. Sherman.* **282**, 387, 79-C3 (1984)
- On the Kelvin-Helmholtz Instabilities of Supersonic Shear Layers. *S. Roy Choudhury and R. V. E. Lovelace.* **283**, 331, 89-E11 (1984)
- The Possibility of Steady State Nonionization Equilibrium Conditions

- in Soft X-Ray Flare Plasmas. *G. A. Doschek.* **283**, 404, 90-D5 (1984)
- On the Propagation of Acoustic Waves in a Radiating Fluid: Addendum. *Dimitri Mihalas and Barbara Weibel Mihalas.* **283**, 469, 91-B10 (1984) (Orig. paper in **273**, 355, 116-B6)
- Confinement of the Crab Pulsar's Wind by Its Supernova Remnant. *C. F. Kennel and F. V. Coroniti.* **283**, 694, 94-E2 (1984)
- Spectra from Pair-Equilibrium Plasmas. *Andrzej A. Zdziarski.* **283**, 842, 96-B5 (1984)
- A Radio Source Occultation Experiment with Comet Austin 1982g, with Unusual Results. *Imke de Pater and Wing-H. Ip.* **283**, 895, 96-F2 (1984)
- Numerical Simulation of the Plasma and Gravitational Dynamics of a Galactic Magnetic Monopole Halo. *Rida Farouki, Stuart L. Shapiro, and Ira Wasserman.* **284**, 282, 101-B3 (1984)
- The Effect of Line-Tying on the Radiative MHD Stability of Coronal Plasmas with Radial Pressure Profile. *Chang-Hyuk An.* **284**, 422, 102-E3 (1984)
- Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XII Lines. *George L. Withbroe and John C. Raymond.* **285**, 347, 113-F7 (1984)
- Heating the Sun's Lower Transition Region with Fine-Scale Electric Currents. *Douglas Rabin and Ronald Moore.* **285**, 359, 113-G5 (1984)
- Temperature Relaxation in Supernova Remnants, Revisited. *Hiroshi Itoh.* **285**, 601, 118-C7 (1984)
- Pair Production Rates in Mildly Relativistic, Magnetized Plasmas. *Michael L. Burns and Alice K. Harding.* **285**, 747, 119-F1 (1984)
- Enhancement of Thermonuclear Reaction Rate due to Screening by Relativistic Degenerate Electrons: Long-Range Correlation Effect. *Settsuo Ichimaru and Kenichi Utsumi.* **286**, 363, 125-G6 (1984)
- Soft X-Ray Opacity in Hot and Photoionized Gases. *Julian H. Krolik and Timothy R. Kallman.* **286**, 366, 125-G9 (1984)
- Monte Carlo Shock-like Solutions to the Boltzmann Equation with Collective Scattering. *Donald C. Ellison and David Eichler.* **286**, 691, 130-F5 (1984)
- Numerical Investigation of Fluid Models with Full Electron and Proton Thermal Conduction Equations for the Quiet Solar Wind. *S. Cuperman, I. Tzur, and M. Dryer.* **286**, 763, 131-D10 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. *Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek.* **286**, 787, 131-F6 (1984)
- Detailed Studies of the Dynamics and Energetics of Coronal Bullets. *Judith T. Karpen, Elaine S. Oran, and Jay P. Boris.* **287**, 396, 137-C4 (1984)
- The Energetics of Chromospheric Evaporation in Solar Flares. *E. Antonucci, A. H. Gabriel, and B. R. Dennis.* **287**, 917, 144-C4 (1984)
- Polarization**
- A Search for Faint Highly Polarized Objects. *Ermanno F. Borra and Gilles Corneveaux.* **276**, 449, 6-D11 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson.* **276**, 572, 7-G4 (1984)
- A New Look at Pulsar Polarization. *Claes-Ingar Björnsson.* **277**, 367, 14-G10 (1984)
- E2003 + 225: A 3^h42^m AM Herculis Type Binary System. *J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal.* **277**, 682, 19-E7 (1984)
- VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. *R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips.* **278**, 220, 26-D4 (1984)
- Polarized Radiation from Hot Plasmas and Applications to AM Herculis Binaries. II. Effect of Collisions and Thomson Scattering. *P. E. Barrett and G. Channugam.* **278**, 298, 27-C2 (1984)
- Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. *A. K. Harding, P. Meszáros, J. G. Kirk, and D. J. Galloway.* **278**, 369, 28-A6 (1984)
- Optical Spectropolarimetry of Radio Galaxies. *Robert R. J. Antonucci.* **278**, 499, 31-D6 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga.* **278**, 530, 31-F9 (1984)
- Induced Atomic Orientation, An Efficient Mechanism for Magnetic Circular Polarization. *James C. Kemp, Joseph H. Macek, and Frederick W. Nehring.* **278**, 863, 35-C9 (1984)
- Interstellar Polarization, Grain Growth, and Alignment: Erratum. *Per A. Aarnestad and J. Mayo Greenberg.* **278**, 893, 35-E11 (1984) (Orig. paper in **272**, 551, 107-G6)
- The Radio Morphology of Blazars and Relationships to Optical Polarization and to Normal Radio Galaxies. *J. F. C. Wardle, Richard L. Moore, and J. R. P. Angel.* **279**, 93, 38-A9 (1984)
- The Polarization of the SiO Masers in Orion: Maser Emission from a Rotating, Expanding Disk? *Richard Barvainis.* **279**, 358, 40-B11

Polarization—Continued

- (1984)
Polarization of Comptonized Photons. *A. C. Williams*. **279**, 401, 41-C12 (1984)
- Very Large Array Observations of Solar Active Regions. IV. Structure and Evolution of Radio Bursts from 20 Centimeter Loops. *Robert F. Willson and Kenneth R. Lang*. **279**, 427, 41-E10 (1984)
- A Comparison of the Properties of Highly Polarized QSOs versus Low-Polarization QSOs. *Richard L. Moore and H. S. Stockman*. **279**, 465, 43-A5 (1984)
- The Optical Polarization Properties of "Normal" Quasars. *H. S. Stockman, Richard L. Moore, and J. R. P. Angel*. **279**, 485, 43-B11 (1984)
- Upper Limits to Magnetic Fields in C II Regions. *Peter R. Silverglate*. **279**, 694, 45-D7 (1984)
- The Morphology of a Mass Loss Episode of the Be Star ω Orionis. *Daniel P. Hayes and Edward F. Guinan*. **279**, 721, 45-F8 (1984)
- On the Rapid Optical Variability of PKS 0129 - 164. *K. Meisenheimer and H. J. Röser*. **279**, L39, 48-A7 (1984)
- A Search for X-Ray Polarization in Cosmic X-Ray Sources. *John P. Hughes, Knox S. Long, and Robert Novick*. **280**, 255, 51-G2 (1984)
- Polarization Evidence for the Isotropy of Electrons Responsible for the Production of 5-20 keV X-Rays in Solar Flares. *Leonard J. Tramiel, Gary A. Chanan, and R. Novick*. **280**, 440, 53-F8 (1984)
- A Statistical Study of the Properties of Radio Galaxies. *Robert R. J. Antonucci*. **281**, 112, 62-B9 (1984)
- Wavelength-Dependent Polarization in the Optical Flux of the BL Lacertae Object B2 1308 + 326. *Michael L. Stiko, Wayne A. Stein, and Gary D. Schmidt*. **282**, 29, 74-C6 (1984)
- Spectral Variability in Early-Type Binary X-Ray Systems. *Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson*. **282**, 245, 76-E7 (1984)
- Time Variability of the 87 GHz Linear Polarization and Flux Density of Active Extragalactic Objects. *Richard Barvainis and C. Read Predmore*. **282**, 402, 79-D6 (1984)
- Magnetic Field Structure in the Taurus Dark Cloud. *Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry*. **282**, 508, 80-F4 (1984)
- The Inner Core of a Bok Globule. *Terry Jay Jones, A. R. Hyland, and Jeremy Bailey*. **282**, 675, 82-D5 (1984)
- Double Faraday Rotation toward 3C 27. *S. J. Goldstein, Jr. and J. A. Reed*. **283**, 540, 92-F9 (1984)
- Polarization Angle in Magnetic White Dwarfs. *Brian Martin and D. T. Wickramasinghe*. **283**, 782, 95-D11 (1984)
- A Radio Source Occultation Experiment with Comet Austin 1982g, with Unusual Results. *Imke de Pater and Wing-H. Ip*. **283**, 895, 96-F2 (1984)
- Effects of Dust on the Infrared Emission, Selected Line Ratios, and Polarization of Seyfert 1 Galaxies, Broad-Line Radio Galaxies, and Quasars. *Richard J. Rudy*. **284**, 33, 98-C10 (1984)
- The Role of the Galactic Magnetic Field in the Evolution of a Dark Globular Filament in Cygnus. *David McDavid*. **284**, 141, 99-E10 (1984)
- Radio Continuum Activity in the Elliptical Galaxy NGC 1052. *J. M. Wrobel*. **284**, 531, 104-G13 (1984)
- Optical Properties of Interstellar Graphite and Silicate Grains. *B. T. Draine and Hyung Mok Lee*. **285**, 89, 111-A3 (1984)
- Linear Polarization of Molecular Lines at Radio Frequencies. *Shuji Deguchi and William D. Watson*. **285**, 126, 111-C12 (1984)
- Linear Polarization of Astronomical Masers and Magnetic Fields. *L. R. Western and W. D. Watson*. **285**, 158, 111-F3 (1984)
- Solar Activity Cycle Variation of the K Corona. *R. Fisher and D. G. Sime*. **285**, 354, 113-F14 (1984)
- Enhancement of Thermonuclear Reaction Rate due to Screening by Relativistic Degenerate Electrons: Long-Range Correlation Effect. *Seisuo Ichimaru and Kenichi Utsumi*. **286**, 363, 125-G6 (1984)
- VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. *W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanromá, and A. Rius*. **286**, 503, 128-E13 (1984)
- Compact-Core-dominated Radio Emission from Bright E/S0 Galaxies. *J. M. Wrobel and D. S. Heeschen*. **287**, 41, 133-D5 (1984)
- A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. *Y. Matsui, Knox S. Long, John R. Dickel, and Eric W. Greisen*. **287**, 295, 136-B9 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). *J. S. Miller, F. O. Clark, and T. H. Troland*. **287**, 892, 144-A7 (1984)
- Is There Really Evidence for Universal Rotation? *Michael F. Bientzenholz and Philipp P. Kronberg*. **287**, L1, 138-C3 (1984)
- High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis*. **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)
- Very Large Array Observations of Jupiter's Nonthermal Radiation. *Imke de Pater and Walter J. Jaffe*. **54**, 405, 7-C10 (1984) (Abstr. in **277**, 908, 22-A9)
- Variations of Betelgeuse's Optical Linear Polarization over Four Consecutive Observing Seasons: 1979-1983. *Daniel P. Hayes*. **55**, 179, 13-E6 (1984) (Abstr. in **280**, 940, 60-B4)
- Pulsar Polarization Fluctuations. I. 1404 MHz Statistical Summaries. *Daniel R. Stinebring, J. M. Cordes, Joanna M. Rankin, J. M. Weisberg, and Valentin Boriakoff*. **55**, 247, 14-D9 (1984) (Abstr. in **280**, 939, 60-B3)
- Pulsar Polarization Fluctuations. II. 800 MHz Statistical Summaries. *Daniel R. Stinebring, J. M. Cordes, J. M. Weisberg, Joanna M. Rankin, and Valentin Boriakoff*. **55**, 279, 14-G7 (1984) (Abstr. in **280**, 939, 60-B3)

Proper Motions: see Stars: Stellar Dynamics

Pulsars

- Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. *M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham*. **276**, 325, 4-C13 (1984)
- Optical Identification of 2S 1417 - 62. *J. E. Grindlay, L. D. Petro, and J. E. McClintock*. **276**, 621, 8-C11 (1984)
- A New Look at Pulsar Polarization. *Claes-Ingvor Björnsson*. **277**, 367, 14-G10 (1984)
- Multifrequency Timing Measurements on the Millisecond Pulsar PRS 1937 + 214. *J. M. Cordes and Daniel R. Stinebring*. **277**, L53, 22-F4 (1984)
- Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. *A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway*. **278**, 369, 28-A6 (1984)
- Evolution of Pulsar-driven Supernova Remnants. *S. P. Reynolds and R. A. Chevalier*. **278**, 630, 32-G7 (1984)
- HEAO 3 Observations of the Crab Pulsar. *W. A. Mahoney, J. C. Ling, and A. S. Jacobson*. **278**, 784, 34-D12 (1984)
- Vortex Creep and the Internal Temperature of Neutron Stars. II. Vela Pulsar. *M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham*. **278**, 791, 34-E5 (1984)
- A Search for Young, Luminous Optical Pulsars in Extragalactic Supernova Remnants. *John Middleditch and Jerome Kristian*. **279**, 157, 38-F5 (1984)
- Constraints on the Progenitor Binary System for PSR 1913 + 16. *J. M. Cordes and I. Wasserman*. **279**, 798, 46-E2 (1984)
- Pulsar Magnetogyro Ratios and Pulsar Evolution. III. Magnetic Field Generation. *James F. Woodward*. **279**, 803, 46-E7 (1984)
- The Expansion Age of the Supernova Remnant RCW 89 = MSH 15 - 52 (G320.4 - 1.2). *Sidney van den Bergh and Karl W. Kamper*. **280**, L51, 60-E1 (1984)
- The X-Ray Nebula around PSR 1509 - 58. *F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank*. **281**, 650, 69-E14 (1984)
- Electromagnetic Damping of Neutron Star Oscillations. *P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen*. **281**, 746, 70-F2 (1984)
- Magnetically Ordered Jets from Pulsars. *Gregory Benford*. **282**, 154, 75-E13 (1984)
- On the Emission of Gravitational Radiation from Inhomogeneous Jacobi Configurations. *James R. Ipser and Robert A. Managan*. **282**, 287, 77-A8 (1984)
- Rapid Postglitch Spin-up of the Superfluid Core in Pulsars. *M. A. Alpar, Stephen A. Langer, and J. A. Sauls*. **282**, 533, 81-A1 (1984)
- Rotating Neutron Star Structure: Implications of the Millisecond Pulsar PSR 1937 + 214. *A. Ray and B. Datta*. **282**, 542, 81-A10 (1984)
- A Study of the Spectra and Pulse Profiles of Centaurus X-3 from Hakucho. *R. Lieu, D. Venkatesan, and K. Mitani*. **282**, 709, 82-F14 (1984)
- Extended Radio Observations of the SNR CTB 109. *V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner*. **283**, 147, 87-F1 (1984)
- Einstein Observations of the Crab Nebula Pulsar. *F. R. Harnden, Jr. and F. D. Seward*. **283**, 279, 89-A12 (1984)
- Confinement of the Crab Pulsar's Wind by Its Supernova Remnant. *C. F. Kennel and F. V. Coroniti*. **283**, 694, 94-E2 (1984)
- Relativistic Charge-separated Winds. *F. C. Michel*. **284**, 384, 102-B7 (1984)
- Search for 10^{15} eV Gamma Rays from the Crab Pulsar and Surrounding Regions. *J. Boone, R. Cady, G. L. Cassiday, J. W. Elbert, E. C. Loh, P. Sokolsky, D. Steck, and S. Wasserbaech*. **285**, 264, 112-G1 (1984)
- Evidence for Pulsed 1000 GeV Gamma-Rays from the Crab Pulsar. *J. C. Dowthwaite, A. B. Harrison, I. W. Kirkman, H. J. Macrae, T. J. L. McComb, K. J. Orford, K. E. Turver, and M. Walmsley*. **286**, L35, 132-D6 (1984)
- The 41.5 Day Binary X-Ray Pulsar 4U 1223 - 62 (GX 301 - 2). *N. E.*

- White and J. H. Swank. **287**, 856, 143-E13 (1984)
 Discovery of ≈ 50 Millisecond Pulsar in the Large Magellanic Cloud. F. D. Seward, F. R. Harnden, Jr., and David J. Helfand. **287**, L19, 138-D5 (1984)
 An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 - 693 in the Large Magellanic Cloud. Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds. **287**, L23, 138-D9 (1984)
 Pulsar Polarization Fluctuations. I. 1404 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, Joanna M. Rankin, J. M. Weisberg, and Valentin Boriakoff. **55**, 247, 14-D9 (1984) (Abstr. in **280**, 939, 60-B3)
 Pulsar Polarization Fluctuations. II. 800 MHz Statistical Summaries. Daniel R. Stinebring, J. M. Cordes, J. M. Weisberg, Joanna M. Rankin, and Valentin Boriakoff. **55**, 279, 14-G7 (1984) (Abstr. in **280**, 939, 60-B3)
- Quantum Mechanics**
 Electrical and Thermal Conductivities of Dense Matter in the Liquid Metal Phase. II. Low-Temperature Quantum Corrections. Shinichi Mitake, Setsuo Ichimaru, and Naoki Itoh. **277**, 375, 15-A4 (1984)
 Relativistic Electron Transport in a Quantizing Magnetic Field. Lars Hernquist. **56**, 325, 27-C7 (1984) (Abstr. in **285**, 875, 121-A6)
- Quasars**
 VLBI Study of 1038 + 528 A and B: Discovery of Wavelength Dependence of Peak Brightness Location. J. M. Marcaide and I. I. Shapiro. **276**, 56, 1-E5 (1984)
 Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin. **276**, 403, 6-A5 (1984)
 X-Ray Observations of Broad Absorption-Line Quasars. Joel N. Bregman. **276**, 423, 6-B12 (1984)
 Optical Characteristics of Young Quasars as Sources of the Cosmic X-Ray Background. Elihu Boldt and Darryl Leiter. **276**, 427, 6-C2 (1984)
 The Broad-Band X-Ray Spectrum of a QSO Sample. D. M. Worrall and F. E. Marshall. **276**, 434, 6-C10 (1984)
 The Quasar Q2345 + 007A, B: A Case for the Double Gravitational Lens? K. Subramanian and S. M. Chitre. **276**, 440, 6-D2 (1984)
 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccacaro. **277**, 43, 11-D6 (1984)
 Observations of Three QSOs with Complex, Broad Absorption Lines. D. A. Turnshek, R. J. Weymann, R. F. Carswell, and M. G. Smith. **277**, 51, 11-E1 (1984)
 The 3000 Å Bump in Quasars. J. B. Oke, G. A. Shields, and D. G. Korycansky. **277**, 64, 11-F1 (1984)
 Evidence for Rapid Optical Variations of the Quasi-stellar Radio Source 4C 29.45. Albert D. Grauer. **277**, 77, 11-F14 (1984)
 An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **277**, 115, 12-B12 (1984)
 CCD Brightness Monitoring of the Twin QSO 0957 + 561. R. E. Schild and T. Weekes. **277**, 481, 17-C13 (1984)
 Is Quasar QS 0630 + 180 Found in the Gamma-Ray Error Box of CG 195 + 4 a Proton Quasar? R. Schlickeiser. **277**, 485, 17-D3 (1984)
 Spectrophotometry and Image Analysis of the Nebulosity around the Low-Redshift Quasar 0241 + 622. W. Romanishin, Holland Ford, Robin Ciardullo, and Bruce Margon. **277**, 487, 17-D5 (1984)
 Observational Tests of X-Ray Heating in the Broad-Line Region of Quasars and Seyfert Galaxies. Gerard A. Kriss. **277**, 495, 17-D13 (1984)
 A Large Quasar Inhomogeneity on the Sky. Halton Arp. **277**, L27, 22-D8 (1984)
 Are Cosmologically Distant Objects Obscured by Dust? A Test Using Quasars. J. P. Ostriker and J. Heisler. **278**, 1, 24-A6 (1984)
 Host Galaxies of Quasars and Their Association with Galaxy Clusters. T. Gehren, J. Fried, P. A. Wehinger, and S. Wyckoff. **278**, 11, 24-B2 (1984)
 X-Ray Variability of Quasars. G. Zamorani, P. Giommi, T. Maccacaro, and H. Tananbaum. **278**, 28, 24-C11 (1984)
 The Absorption Line Profiles in Q1101-264. Robert F. Carswell, Donald C. Morton, Malcolm G. Smith, Alan N. Stockton, David A. Turnshek, and Ray J. Weymann. **278**, 486, 36-C6 (1984)
 Optical Spectropolarimetry of Radio Galaxies. Robert R. J. Antonucci. **278**, 499, 31-D6 (1984)
 IRAS Observations of Radio-Quiet and Radio-Loud Quasars. G. Neugebauer, B. T. Soifer, G. Miley, E. Young, C. A. Beichman, P. E. Clegg, H. J. Habing, S. Harris, F. J. Low, and M. Rowan-Robinson. **278**, L83, 30-D2 (1984)
 New Results on the Formation of Broad Emission Lines in QSOs. David A. Turnshek. **278**, L87, 36-A4 (1984)
- The Rotation Measure Distribution of QSOs and of Intervening Clouds: Magnetic Fields and Column Densities. G. L. Welter, J. J. Perry, and P. P. Kronberg. **279**, 19, 37-B11 (1984)
 Alternating-Side Ejection in Extragalactic Radio Sources. L. Rudnick and B. K. Edgar. **279**, 74, 37-G2 (1984)
 The Radio Morphology of Blazars and Relationships to Optical Polarization and to Normal Radio Galaxies. J. F. C. Wardle, Richard L. Moore, and J. R. P. Angel. **279**, 93, 38-A9 (1984)
 A Comparison of the Properties of Highly Polarized QSOs versus Low-Polarization QSOs. Richard L. Moore and H. S. Stockman. **279**, 465, 43-A5 (1984)
 The Optical Polarization Properties of "Normal" Quasars. H. S. Stockman, Richard L. Moore, and J. R. P. Angel. **279**, 485, 43-B11 (1984)
 Why Do Few High-Redshift QSO Narrow-Line Absorption Systems Exhibit Mixed Ionization Spectra? T. W. Hartquist and J. E. Dyson. **279**, L35, 48-A5 (1984)
 Optical Imaging of 78 Quasars and Host Galaxies. J. B. Hutchings, D. Crampton, and Bruce Campbell. **280**, 41, 49-D8 (1984)
 Properties of the Broad Absorption-Line QSOs. David A. Turnshek. **280**, 51, 49-E6 (1984)
 The Underlying Galaxies of X-Ray-Selected Quasars. Matthew A. Malkan, Bruce Margon, and Gary A. Chanan. **280**, 66, 49-F7 (1984)
 An Imaging Survey of Fields around Quasars. II. The Association of Galaxies with Quasars. H. K. C. Yee and Richard F. Green. **280**, 79, 49-G10 (1984)
 X-Ray and UV Observations of Two Radio-bright Quasars. Martin Elvis and G. Fabbiano. **280**, 91, 50-A8 (1984)
 Infrared Observations of the 3C 273 Jets. J. Patrick Henry, E. E. Becklin, and C. M. Telesco. **280**, 98, 50-B1 (1984)
 The Radio Properties of the Broad Absorption-Line Quasars. J. T. Stocke, C. B. Foltz, R. J. Weymann, and W. A. Christiansen. **280**, 476, 55-B2 (1984)
 Emission-Line Profiles in Low-Redshift QSOs. James M. Shuder. **280**, 491, 55-C3 (1984)
 Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt. **280**, 499, 55-C11 (1984)
 The Interaction of Relativistic Charged-Particle Beams with Interstellar Clouds. William K. Rose, John Guillery, James H. Beall, and Selig Kainer. **280**, 550, 55-G8 (1984)
 Luminosity Enhancement in Relativistic Jets and Altered Luminosity Functions for Beamed Objects. C. M. Urry and R. A. Shafer. **280**, 569, 55-A14 (1984)
 Splitting of C IV Lines in a QSO Absorption-Line System. D. G. York, Richard F. Green, Jill Bechtold, and Frederic H. Chaffee, Jr. **280**, L1, 54-C2 (1984)
 IUE Observations of High-Redshift Quasars. Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman. **281**, 76, 61-F12 (1984)
 The Kinematics of the Narrow-Line Region in Active Galaxies and Quasars. III. Correlations with the Broad-Line Region and Radio Emission. T. M. Heckman, G. K. Miley, and R. F. Green. **281**, 525, 68-C9 (1984)
 Spectroscopy of the Nebulosity around Eight High-Luminosity QSOs. Todd A. Boroson and J. B. Oke. **281**, 535, 68-D5 (1984)
 Soft X-Ray Active Galactic Nuclei. Steven H. Pravdo and Francis E. Marshall. **281**, 570, 68-G12 (1984)
 Improved Lower Limits on Lyman-Alpha Forest Cloud Dimensions and Additional Evidence Supporting the Gravitational Lens Nature of 2345 + 007A,B. Craig B. Foltz, Ray J. Weymann, Hermann-Josef Röser, and Frederic H. Chaffee, Jr. **281**, L1, 65-E2 (1984)
 Nine New Quasi-stellar Objects with Broad Absorption Lines. C. Hazard, Donald C. Morton, Roberto Terlevich, and Richard McMahon. **282**, 33, 74-C10 (1984)
 Nonadiabatic Self-consistent Spherical Accretion as a Model for Quasars and Active Galactic Nuclei. A. Wandel, A. Yahil, and M. Milgrom. **282**, 53, 74-E4 (1984)
 Discovery of a New Gravitational Lens. S. Djorgovski and H. Spinrad. **282**, L1, 78-A2 (1984)
 Cosmic Strings as Gravitational Lenses. Alexander Vilenkin. **282**, L51, 85-A8 (1984)
 A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
 Two Newly Discovered Quasars Closely Spaced across a Galaxy. Halton Arp. **283**, 59, 86-F3 (1984)
 Images and Spectra of the Host Galaxy of the QSO Markarian 1014. John W. Mackenty and Alan Stockton. **283**, 64, 86-F9 (1984)
 Photoionization Models and Diagnosis of Physical Properties of the Broad-Line Emission Gas in Quasars and Seyfert Nuclei. John

Quasars—Continued

- Kwan. **283**, 70, 86-G5 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. Tommaso Maccacaro, Isabella M. Gioia, and John T. Stocke. **283**, 486, 92-B6 (1984)
- Gravitational Lens Models for the Triple Radio Source MG 2016 + 112. D. Narasimha, K. Subramanian, and S. M. Chitre. **283**, 512, 92-D9 (1984)
- Radio Jets in Classical Double Radio Sources with Strong Cores. Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia. **283**, 515, 92-D12 (1984)
- Are Forbidden Lines Present in the Optical Spectrum of the QSO 3C 273? B. M. Peterson, K. A. Meyers, and E. R. Capriotti. **283**, 529, 92-E12 (1984)
- The Statistics of Gravitational Lenses: The Distributions of Image Angular Separations and Lens Redshifts. Edwin L. Turner, Jeremiah P. Ostriker, and Richard J. Gott III. **284**, 1, 98-A6 (1984)
- He I $\lambda 10830$ Emission in Seyfert Galaxies and QSOs. P. D. LeVan, R. C. Puetter, Harding E. Smith, and Richard J. Rudy. **284**, 23, 98-B14 (1984)
- Effects of Dust on the Infrared Emission, Selected Line Ratios, and Polarization of Seyfert 1 Galaxies, Broad-Line Radio Galaxies, and Quasars. Richard J. Rudy. **284**, 33, 98-C10 (1984)
- Distribution Functions of Intergalactic Clouds. Richard D. Sherman. **284**, 457, 104-B9 (1984)
- An X-Ray Survey of Variable Radio Bright Quasars. Mark J. Henriksen, Francis E. Marshall, and Richard F. Mushotzky. **284**, 491, 104-E1 (1984)
- Spectrophotometry of Intermediate-Redshift Quasars. Alan Uomoto. **284**, 497, 104-E7 (1984)
- Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke. **284**, L5, 103-A6 (1984)
- Complete Quasar Search in the NGC 1097 Field. Halton Arp, R. D. Wolstencroft, and X. T. He. **285**, 44, 110-D7 (1984)
- Constraints on Continuous Beam Models of the Jet in 3C 273. Dana Roberts. **285**, 64, 110-F4 (1984)
- Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen. **285**, 515, 117-B6 (1984)
- Nineteen Newly Discovered Quasars in the Declination -35° Zone. I. Halton Arp. **285**, 547, 117-D10 (1984)
- Properties of the Quasars in the Sculptor Region. II. Halton Arp. **285**, 555, 117-E12 (1984)
- [O III] Emission Surrounding the Quasar MR 2251-178. S. di Serego Alighieri, M. A. C. Perryman, and F. Macchetto. **285**, 567, 117-F10 (1984)
- Radiation Pressure and the Stability of Broad-Line Region Clouds. G. J. Ferland and Moshe Elitzur. **285**, L11, 114-F11 (1984)
- Redshifts of Southern Radio Sources. VI. David L. Jauncey, Michael J. Batty, Alan E. Wright, Bruce A. Peterson, and Ann Savage. **286**, 498, 128-E8 (1984)
- VLBI Observations of the Polarized Radio Emission from the Quasar 3C 454.3. W. D. Cotton, B. J. Geldzahler, J. M. Marcaide, I. I. Shapiro, M. Sanromà, and A. Rius. **286**, 503, 128-E13 (1984)
- Image Separation Statistics for Multiply Imaged Quasars. C. C. Dyer. **287**, 26, 133-C5 (1984)
- On the Origin of Power-Law X-Ray Spectra of AGNs. Isaac Schlosman, Jacob Shaham, and Giora Shaviv. **287**, 534, 140-A7 (1984)
- The Milli-arcsecond Images of Q0957 + 561. M. V. Gorenstein, I. I. Shapiro, A. E. E. Rogers, N. L. Cohen, B. E. Corey, R. W. Porcas, E. E. Falco, R. J. Bonometti, R. A. Preston, A. Rius, and A. R. Whitney. **287**, 538, 140-A11 (1984)
- The Broad Absorption Lines in the Spectrum of the QSO PKS 1157 + 014: A Possible Link between Broad Absorption Line QSOs, Metal Enrichment, and the Formation of Galaxies. F. H. Briggs, D. A. Turnshek, and A. M. Wolfe. **287**, 549, 140-B8 (1984)
- The Underlying Galaxies of Quasars. II. Imaging of a Radio-loud Sample. Matthew A. Malkan. **287**, 555, 140-C1 (1984)
- A Medium-Bright Quasar Sample: New Quasar Surface Densities in the Magnitude Range $16.4 < B < 17.65$. Kenneth J. Mitchell, Archibald Warnock III, and Peter D. Usher. **287**, L3, 138-C5 (1984)
- Far-Infrared Photometry of Compact Extragalactic Sources: OJ 287 and BL Lacertae. Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking. **287**, L9, 138-C10 (1984)
- An Imaging Survey of Fields around Quasars. I. A Catalog. Richard F. Green and H. K. C. Yee. **54**, 495, 8-E5 (1984) (Abstr. in **278**, 895, 35-E13)
- An Atlas of QSO Luminosity Profiles. J. B. Hutchings, D. Crampton, B. Campbell, D. Duncan, and B. Glendenning. **55**, 319, 15-C4 (1984) (Abstr. in **280**, 940, 60-B4)
- The Case Low-Dispersion Northern Sky Survey. II. N. Sanduleak and Peter Pesch. **55**, 517, 17-F13 (1984) (Abstr. in **281**, 892, 72-C5)
- Wide-Angle Radio Tail QSOs as Members of Clusters of Galaxies. II. Direct Optical Observations and Spectroscopy of QSO Fields. Paul Hintzen. **55**, 533, 18-A1 (1984) (Abstr. in **281**, 891, 72-C4)
- Faint Blue Objects at High Galactic Latitude. IV. Palomar Schmidt Fields Centered on Selected Areas 55 and 94. Ke-Liang Huang and Peter D. Usher. **56**, 393, 28-B1 (1984) (Abstr. in **285**, 875, 121-A6)
- Radar Astronomy**
- Testing the Strong Equivalence Principle by Radio Ranging. V. M. Canuto, I. Goldman, and I. I. Shapiro. **276**, 1, 1-A6 (1984)
- Radial Velocities**
- A Search for Radial Velocity Variations in the Blue Stragglers of NGC 7789. L. L. Stryker and B. J. Hrivnak. **278**, 215, 26-C13 (1984)
- A Spectroscopic Study of the Peculiar Giant FK Comae. I. The Radial Velocity Variation and Its Implications. James K. McCarthy and Lawrence W. Ramsey. **283**, 200, 88-B14 (1984)
- Kinematics and Dynamics of the H II Region Sharpless 142. I. The Velocity Field of the Ionized Hydrogen. Gilles Joncas and Jean-René Roy. **283**, 640, 94-A1 (1984)
- The Dependence on Distance and Redshift of the Velocity Vectors of the Sun, the Galaxy, and the Local Group with Respect to Different Extragalactic Frames of Reference. G. de Vaucouleurs and W. L. Peters. **287**, 1, 133-A6 (1984)
- Ultraviolet and Optical Studies of Binaries with Luminous Cool Primaries and Hot Companions. III. Reticon Radial Velocities: Erratum. Sidney B. Parsons. **54**, 372, 6-C10 (1984) (Orig. paper in **53**, 553, 24-E1)
- The Globular Cluster System of the Galaxy. III. Measurements of Radial Velocity and Metallicity for 60 Clusters and a Compilation of Metallicities for 121 Clusters. Robert Zinn and Michael J. West. **55**, 45, 11-D4 (1984) (Abstr. in **279**, 910, 47-G1)
- Radiation Mechanisms**
- Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Darbro. **276**, 691, 9-B1 (1984)
- A Study of the Evolution of Energetic Electrons in a Solar Flare. Gordon D. Holman, M. R. Kundu, and B. R. Dennis. **276**, 761, 9-G1 (1984)
- The 3000 Å Bump in Quasars. J. B. Oke, G. A. Shields, and D. G. Korycansky. **277**, 64, 11-F1 (1984)
- The Electron Energy Spectrum Produced in Radio Sources by Turbulent, Resonant Acceleration. Jean A. Eilek and Richard N. Henriksen. **277**, 820, 21-B1 (1984)
- Analysis of Solar Flare Gamma-Ray Events. C. Kouveliotou, R. A. Treumann, and M. Scholer. **278**, 420, 28-E1 (1984)
- The Energy Spectrum of Electrons and Cosmic-Ray Confinement: A New Measurement and Its Interpretation. K.-K. Tang. **278**, 881, 35-D13 (1984)
- Polarization of Comptonized Photons. A. C. Williams. **279**, 401, 41-C12 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama. **279**, 413, 41-D10 (1984)
- VLA Observations of Fine Structures in a Solar Active Region at 6 Centimeter Wavelength. D. McConnell and M. R. Kundu. **279**, 421, 41-E4 (1984)
- The Optical Polarization Properties of "Normal" Quasars. H. S. Stockman, Richard L. Moore, and J. R. P. Angel. **279**, 485, 43-B11 (1984)
- Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda. **279**, 515, 43-D13 (1984)
- Optical Spectrophotometry of the M87 Jet and Its Environs. William C. Keel. **279**, 550, 43-G7 (1984)
- Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. W. A. Baily, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini. **279**, 555, 44-A1 (1984)
- The Bremsstrahlung Component of the Diffuse Galactic Gamma-Ray Emission at MeV Energies. W. Sacher and V. Schönfelder. **279**, 817, 46-F7 (1984)
- Microwave Signature of Thick-Target Electron Beams in Solar Flares. A. Gordon Emslie and Dean F. Smith. **279**, 882, 47-D10 (1984)

- Infrared Observations of the 3C 273 Jets. *J. Patrick Henry, E. E. Becklin, and C. M. Telesco.* **280**, 98, 50-B1 (1984)
- Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Noli, and J. V. Radostitz.* **280**, 102, 50-B7 (1984)
- Two-Temperature Model of Spherical Accretion onto a Black Hole. *M. Colpi, L. Maraschi, and A. Treves.* **280**, 319, 52-D11 (1984)
- Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. *R. R. Sharma and Loukas Vlahos.* **280**, 405, 53-D1 (1984)
- Polarization Evidence for the Isotropy of Electrons Responsible for the Production of 5–20 keV X-Rays in Solar Flares. *Leonard J. Tramiel, Gary A. Chanan, and R. Novick.* **280**, 440, 53-F8 (1984)
- Relativistic Jet Meets Target: The Gamma-Rays from 3C 273. *Philip Morrison, Dana Roberts, and Alberto Sadun.* **280**, 483, 55-B9 (1984)
- Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. *R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt.* **280**, 499, 55-C11 (1984)
- 1–20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward.* **280**, 514, 56-B5 (1984)
- The Detection of Variable, Nonthermal Radio Emission from Two O Type Stars. *David C. Abbott, J. H. Bieging, and E. Churchwell.* **280**, 671, 57-B10 (1984)
- Opacities for Comptonization Plus Emission and Absorption. *Martin A. Schwiezer.* **280**, 809, 58-F3 (1984)
- Decimetric Gyrosynchrotron Emission during a Solar Flare. *David A. Batchelor, Arnold O. Benz, and Herbert J. Wiehl.* **280**, 879, 59-D3 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the *Hinotori* Spacecraft. *S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo.* **280**, 887, 59-D12 (1984)
- Ultraviolet Observations of Starburst and Mini-Seyfert Galactic Nuclei. *Trinh X. Thuan.* **281**, 126, 62-C9 (1984)
- The X-Ray Nebula around PSR 1509 – 58. *F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank.* **281**, 650, 69-E14 (1984)
- Wavelength-Dependent Polarization in the Optical Flux of the BL Lacertae Object B2 1308 + 326. *Michael L. Sitko, Wayne A. Stein, and Gary D. Schmidt.* **282**, 29, 74-C6 (1984)
- Nonadiabatic Self-consistent Spherical Accretion as a Model for Quasars and Active Galactic Nuclei. *A. Wandel, A. Yahil, and M. Milgrom.* **282**, 53, 74-E4 (1984)
- Optical Properties of Spiral Galaxies with Strong Nuclear Radio Sources: Active Nuclei, Starbursts, and Composite Objects. *William C. Keel.* **282**, 75, 74-F13 (1984)
- Radio-Frequency Heating of the Coronal Plasma during Flares. *D. B. Melrose and G. A. Dulk.* **282**, 308, 77-C1 (1984)
- Two-Frequency Radio Spectra during the Outburst of the Periodic Radio Star LSI +61°303. *A. R. Taylor and P. C. Gregory.* **283**, 273, 89-A6 (1984)
- Three-dimensional Structures of Two Solar Active Regions from VLA Observations at 2, 6, and 20 Centimeter Wavelengths. *R. K. Shevgaonkar and M. R. Kundu.* **283**, 413, 90-D14 (1984)
- Magnetohydrodynamic Model of Crab Nebula Radiation. *C. F. Kennel and F. V. Coroniti.* **283**, 710, 94-F4 (1984)
- Spectra from Pair-Equilibrium Plasmas. *Andrzej A. Zdziarski.* **283**, 842, 96-B5 (1984)
- Resonant Absorption, Hot Electrons, and Cosmic Gamma-Ray Bursts. *E. P. Liang.* **283**, L21, 91-F9 (1984)
- A Radio Survey of Symbiotic Stars. *E. R. Seaquist, A. R. Taylor, and S. Button.* **284**, 202, 100-C7 (1984)
- Nonthermal Synchrotron Radiation in a Strong Magnetic Field. *R. W. Bussard.* **284**, 357, 101-G8 (1984)
- Relativistic Charge-separated Winds. *F. C. Michel.* **284**, 384, 102-B7 (1984)
- An X-Ray Survey of Variable Radio Bright Quasars. *Mark J. Henriksen, Francis E. Marshall, and Richard F. Mushotzky.* **284**, 491, 104-E1 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason.* **284**, 512, 104-F8 (1984)
- Infrared Emission from Accretion Disks: Detectability and Variability. *J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke.* **284**, 745, 107-B9 (1984)
- The Production of Very High Energy Photons and Neutrinos from Cosmic Proton Sources. *V. J. Stenger.* **284**, 810, 107-F7 (1984)
- The Ionization Mechanism for Gas in the Nuclei of NGC 1052 and NGC 4278. *James A. Rose and Michael J. Tripicco.* **285**, 55, 110-E9 (1984)
- Constraints on Continuous Beam Models of the Jet in 3C 273. *Dana Roberts.* **285**, 64, 110-F4 (1984)
- The Evolution of Nonthermal Supernova Remnants. II. Can Radio Supernovae Become Plerions? *R. Bandiera, F. Pacini, and M. Salvati.* **285**, 134, 111-D6 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 – 451 in the High and Low States. *L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips.* **285**, 214, 112-C6 (1984)
- The Cross Section for Double Compton Scattering. *Robert J. Gould.* **285**, 275, 113-A1 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki.* **285**, 304, 113-C2 (1984)
- NGC 7213: A Key to the Nature of Liners? *Alexei V. Filippenko and J. P. Halpern.* **285**, 458, 116-D10 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. *S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge.* **285**, 571, 117-G2 (1984)
- Temperature Relaxation in Supernova Remnants, Revisited. *Hiroshi Itoh.* **285**, 601, 118-C7 (1984)
- Radiation Pressure and the Stability of Broad-Line Region Clouds. *G. J. Ferland and Moshe Elitzur.* **285**, L11, 114-F11 (1984)
- Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. *G. J. Ferland and R. F. Mushotzky.* **286**, 42, 122-D4 (1984)
- The Ionization Mechanisms of the "Liner" Galaxies Pictor A and PKS 1718 – 65. *R. F. Carswell, J. A. Baldwin, Bruce Atwood, and M. M. Phillips.* **286**, 464, 128-B10 (1984)
- Multifrequency Spectral Behavior of the BL Lacertae Objects OI 90.4 and 3C 66A. *D. M. Worrall, J. J. Puschell, J. M. Rodriguez-Espinoza, F. C. Bruhweiler, H. R. Miller, M. F. Aller, and H. D. Aller.* **286**, 711, 131-G11 (1984)
- Photon-Photon Absorption and the Uniqueness of the Spectra of Active Galactic Nuclei. *Demosthenes Kazanas.* **287**, 112, 134-B10 (1984)
- On the Origin of Power-Law X-Ray Spectra of AGNs. *Isaac Schlosman, Jacob Shaham, and Giora Shaviv.* **287**, 534, 140-A7 (1984)
- The Energetics of Chromospheric Evaporation in Solar Flares. *E. Antonucci, A. H. Gabriel, and B. R. Dennis.* **287**, 917, 144-C4 (1984)
- An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 – 693 in the Large Magellanic Cloud. *Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds.* **287**, L23, 138-D9 (1984)
- ### Radiative Transfer
- Transfer of Resonance Line Radiation in the Comoving Frame of an Expanding Cylinder. *Paul B. Kunasz.* **276**, 677, 9-A1 (1984)
- Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. *A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Dorbro.* **276**, 691, 9-B1 (1984)
- A New Look at Pulsar Polarization. *Claes-Ingvær Björnsson.* **277**, 367, 14-G10 (1984)
- Radiative Transfer Equations in Broad-Band, Time-varying Fields. *J. Cooper and P. Zoller.* **277**, 813, 21-A8 (1984)
- Bipolar Reflection Nebulae: Monte Carlo Simulations. *F. Yusef-Zadeh, Mark Morris, and Richard L. White.* **278**, 186, 26-A11 (1984)
- Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. *A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway.* **278**, 369, 28-A6 (1984)
- Polarization of Comptonized Photons. *A. C. Williams.* **279**, 401, 41-C12 (1984)
- A Static Model of Chromospheric Heating in Solar Flares: Erratum. *Paul J. Ricchiazzi and Richard C. Canfield.* **279**, 463, 42-A11 (1984) (Orig. paper in **272**, 739, 109-G5)
- X-Ray Nebular Models. II. Constant Pressure Clouds. *T. R. Kallman.* **280**, 269, 52-A3 (1984)
- On Hydrogen Line Emission from Regions Exposed to Strong Radiation Fields. *Moshe Elitzur.* **280**, 653, 57-A6 (1984)
- A High-Order Spherical Harmonics Solution to the Standard Problem in Radiative Transfer. *M. Benassi, R. D. M. Garcia, A. H. Karp, and C. E. Siewert.* **280**, 853, 59-B5 (1984)
- CO Line Emission from Shock Waves in Molecular Clouds. *B. T. Draine and W. G. Roberge.* **282**, 491, 80-E1 (1984)
- Line Locking and SS 433. *Miriam Pekarevich, Tsvi Piran, and Jacob Shaham.* **283**, 295, 88-C3 (1984)
- On the Propagation of Acoustic Waves in a Radiating Fluid: Addendum. *Dimitri Mihalas and Barbara Weibel Mihalas.* **283**, 469, 91-B10 (1984) (Orig. paper in **273**, 355, 116-B6)
- Self-consistent Radiation-hydrodynamic Equations for Stellar Oscillations. I. Nonlinear Form. *Barbara Weibel Mihalas.* **284**, 299, 101-C6 (1984)

Radiative Transfer—Continued

- Optically Thick Ablation Fronts. *Arieh Königl*. **284**, 303, 101-C10 (1984)
- Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. II. Implementation of the Method. *P. G. Martin, C. Rogers, and G. B. Rybicki*. **284**, 317, 101-D10 (1984)
- Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. III. Numerical Solution and Applications. *C. Rogers and P. G. Martin*. **284**, 327, 101-E6 (1984)
- Instabilities in Line-driven Stellar Winds. I. Dependence on Perturbation Wavelength. *S. P. Owocki and G. B. Rybicki*. **284**, 337, 101-F2 (1984)
- Wave Amplification in Line-driven Winds. *L. B. Lucy*. **284**, 351, 101-G2 (1984)
- CO Line Emission from the Expanding Circumstellar Envelopes of Red Giants. *William K. Rose*. **285**, 237, 112-E2 (1984)
- Minimum Entropy Production in the Steady State and Radiative Transfer. *Christopher Essex*. **285**, 279, 113-A5 (1984)
- Vibrational and Rotational Excitation of CO in Comets: Nonequilibrium Calculations. *G. Chin and H. A. Weaver*. **285**, 858, 120-G2 (1984)
- P¹-I¹-Range Moment Methods for Radiative Transfer in Spherical Geometry. V. Line Formation in a Static Atmosphere. *C. Rogers*. **286**, 659, 130-D1 (1984)
- Self-Absorption of High-Energy Gamma-Rays in Cygnus X-3. *Krishna M. V. Apparao*. **287**, 338, 136-E14 (1984)
- The Effects of the Diffuse Radiation Fields Due to Multiple Scattering and Thermal Reradiation by Dust on the Dynamics and Thermodynamics of a Dusty Cometary Atmosphere. *M. L. Marconi and D. A. Mendis*. **287**, 445, 137-F11 (1984)
- Line Emission from H II Blister Models. *Robert H. Rubin*. **287**, 653, 141-D8 (1984)
- Apparent Solar Temperature Enhancement due to Large-Amplitude Waves. *W. Kalkofen, P. Ulmschneider, and F. Schmitz*. **287**, 952, 144-E11 (1984)
- Radio Sources: Extended**
- A New Type of Extended Nonthermal Radio Emitter: Detection of the Old Nova GK Persei. *Stephen P. Reynolds and Roger A. Chevalier*. **281**, L33, 66-G4 (1984)
- Is 3C 310 Blowing Bubbles? *Wil van Breugel and E. B. Fomalont*. **282**, L55, 85-A11 (1984)
- Small-Scale Isotropy of the Cosmic Microwave Background at 19.5 GHz. *Juan M. Uson and David T. Wilkinson*. **283**, 471, 92-A5 (1984)
- Limits of Arcsecond-Scale Fluctuations in the Cosmic Microwave Background. *J. E. Knoke, R. B. Partridge, M. I. Ratner, and I. I. Shapiro*. **284**, 479, 104-D3 (1984)
- Emission-Line Gas Associated with the Radio Lobes of the High-Luminosity Radio Source 3C 171. *T. M. Heckman, W. J. M. van Breugel, and G. K. Miley*. **286**, 509, 128-F5 (1984)
- Radio Sources: Galaxies**
- Optical Line Emission Associated with the Radio Galaxy 4C 26.42 in the Cluster of Galaxies Abell 1795. *Wil van Breugel, Timothy Heckman, and George Miley*. **276**, 79, 1-F14 (1984)
- 4C 29.47: Quasi-periodic Outbursts Recorded by Precessing Jets? *J. J. Condon and K. J. Mitchell*. **276**, 472, 6-F8 (1984)
- Structure of the Compact Radio Sources in NGC 1052 and NGC 4278. *Dayton L. Jones, J. M. Wrobel, and D. B. Shaffer*. **276**, 480, 6-G3 (1984)
- Bent Jets in High-Redshift Galaxies. *P. M. Allan*. **276**, L31, 10-E4 (1984)
- Extended Optical Line Emission from 3C 293: Radio Jets Propagating through a Rotating Gaseous Disk. *Wil van Breugel, Timothy Heckman, Harvey Butcher, and George Miley*. **277**, 82, 11-G5 (1984)
- Neutral Hydrogen in Seyfert Galaxies. *I. F. Mirabel and A. S. Wilson*. **277**, 92, 12-A3 (1984)
- Propagation and Growth of Surface Waves on a Supersonic Fluid Jet. *Philip E. Hardee*. **277**, 106, 12-B3 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **277**, 115, 12-B12 (1984)
- Arp 91: Interaction and Star Formation in a Galaxy Pair. *C. R. Jenkins*. **277**, 501, 17-E5 (1984)
- A Large Quasar Inhomogeneity on the Sky. *Halton Arp*. **277**, L27, 22-D8 (1984)
- What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen*. **278**, 37, 24-D6 (1984)
- The 20 Year Spectral Evolution of the Radio Nucleus of NGC 1275. *Christopher P. O'Dea, William A. Dent, and Thomas J. Balonek*. **278**, 89, 25-A5 (1984)
- The Distances and Properties of a Sample of Sc I Galaxies. *Gregory D. Bothum, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould*. **278**, 475, 31-B9 (1984)
- Optical Spectropolarimetry of Radio Galaxies. *Robert R. J. Antonucci*. **278**, 499, 31-D6 (1984)
- Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock*. **278**, 521, 31-E14 (1984)
- The Dusty, Luminous Broad-Line Radio Galaxy 3C 109. *Richard J. Rudy, G. D. Schmidt, H. S. Stockman, and Alan T. Tokunaga*. **278**, 530, 31-F9 (1984)
- Radio Structures of Seyfert Galaxies. V. A Flux-Limited Sample of Markarian Galaxies. *James S. Ulvestad and A. S. Wilson*. **278**, 544, 31-G9 (1984)
- A 25 Micron Component in 3C 390.3. *G. Miley, G. Neugebauer, P. E. Clegg, S. Harris, M. Rowan-Robinson, B. T. Soifer, and E. Young*. **278**, L79, 30-C14 (1984)
- 3C 111: A Luminous Radio Galaxy with a Highly Collimated Jet. *Roger Linfield and Rick Perley*. **279**, 60, 37-E14 (1984)
- Alternating-Side Ejection in Extragalactic Radio Sources. *L. Rudnick and B. K. Edgar*. **279**, 74, 37-G2 (1984)
- The Compact Radio Source 2021 + 614: A Peculiar Narrow-Line Radio Galaxy. *Norbert Bartel, Irwin I. Shapiro, John P. Huchra, and Helmut Kühr*. **279**, 112, 38-B13 (1984)
- The Compact Radio Source 2021 + 614: Simultaneous 2.3 and 8.3 GHz Mark III VLBI Observations. *N. Bartel, I. I. Shapiro, B. E. Corey, J. M. Marcaide, A. E. E. Rogers, A. R. Whitney, R. J. Cappallo, H. Kühr, D. A. Graham, and L. B. Bååth*. **279**, 116, 38-C3 (1984)
- The Optical Polarization Properties of "Normal" Quasars. *H. S. Stockman, Richard L. Moore, and J. R. P. Angel*. **279**, 485, 43-B11 (1984)
- Millimeter-Wave Observations of Flat Spectrum Radio Sources. *W. K. Gear, E. I. Robson, P. A. R. Ade, M. G. Smith, P. E. Clegg, C. T. Cunningham, M. J. Griffin, I. G. Nolt, and J. V. Radostitz*. **280**, 102, 50-B7 (1984)
- 1–20 Micron Infrared Photometry of 3CR Radio Galaxies. *Martin Elvis, S. P. Willner, G. Fabbiano, N. P. Carleton, A. Lawrence, and Martin Ward*. **280**, 514, 56-B5 (1984)
- The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. *D. E. Harris, C. H. Costain, and P. E. Dewdney*. **280**, 532, 55-F3 (1984)
- The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. *K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus*. **280**, 542, 55-F13 (1984)
- 3C 324—An Extremely Distant Cluster Radio Galaxy. *Hyron Spinrad and S. Djorgovski*. **280**, L9, 54-C11 (1984)
- A Statistical Study of the Properties of Radio Galaxies. *Robert R. J. Antonucci*. **281**, 112, 62-B9 (1984)
- Hot Spots in Cygnus A at 89 GHz. *Melvyn Wright and Mark Birkinshaw*. **281**, 135, 62-D4 (1984)
- The Kinematics of the Narrow-Line Region in Active Galaxies and Quasars. III. Correlations with the Broad-Line Region and Radio Emission. *T. M. Heckman, G. K. Miley, and R. F. Green*. **281**, 525, 68-C9 (1984)
- Optical Properties of Spiral Galaxies with Strong Nuclear Radio Sources: Active Nuclei, Starbursts, and Composite Objects. *William C. Keel*. **282**, 75, 74-F13 (1984)
- Time Variability of the 87 GHz Linear Polarization and Flux Density of Active Extragalactic Objects. *Richard Barvainis and C. Read Predmore*. **282**, 402, 79-D6 (1984)
- Is 3C 310 Blowing Bubbles? *Wil van Breugel and E. B. Fomalont*. **282**, L55, 85-A11 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- Gravitational Lens Models for the Triple Radio Source MG 2016 + 112. *D. Narasimha, K. Subramanian, and S. M. Chitre*. **283**, 512, 92-D9 (1984)
- Radio Jets in Classical Double Radio Sources with Strong Cores. *Jack O. Burns, John P. Basart, David S. De Young, and Dennis C. Ghiglia*. **283**, 515, 92-D12 (1984)
- MHD Kelvin-Helmholtz Instability in Extended Radio Jets. *Ralph Fielder and T. W. Jones*. **283**, 532, 92-F1 (1984)
- Double Faraday Rotation toward 3C 27. *S. J. Goldstein, Jr. and J. A. Reed*. **283**, 540, 92-F9 (1984)
- Effects of Dust on the Infrared Emission, Selected Line Ratios, and Polarization of Seyfert 1 Galaxies, Broad-Line Radio Galaxies, and Quasars. *Richard J. Rudy*. **284**, 33, 98-C10 (1984)
- Cosmological Evolution of Radio Sources Found at 1.4 GHz. *J. J. Condon*. **284**, 44, 98-D7 (1984)
- X-Ray Observations of Spiral Galaxies. I. Integrated Properties. *G. Fabbiano, G. Trinchieri, and A. Macdonald*. **284**, 65, 98-E14 (1984)
- 1.4 GHz Continuum Sources in the Hercules Cluster. *J. M. Dickey and E. E. Salpeter*. **284**, 461, 104-B13 (1984)
- A Search at the Millijansky Level for Milli-arcsecond Cores in a

- Complete Sample of Radio Galaxies. *Ann E. Wehrle, Robert A. Preston, David L. Meier, Marc V. Gorenstein, Irwin J. Shapiro, Alan E. Rogers, and Antonio Ruis.* **284**, 519, 104-G1 (1984)
- Reddening in the Broad-Line Radio Galaxy 3C 234. *N. P. Carleton, S. P. Willner, Richard J. Rudy, and A. T. Tokunaga.* **284**, 523, 104-G5 (1984)
- Radio Continuum Activity in the Elliptical Galaxy NGC 1052. *J. M. Wrobel.* **284**, 531, 104-G13 (1984)
- Radio Structures of Seyfert Galaxies. VI. VLA Observations of a Nearby Sample. *James S. Ulvestad and A. S. Wilson.* **285**, 439, 116-C5 (1984)
- Near-Infrared Photometry of Faint Radio Galaxies in Selected Areas. *Trinh X. Thuan, Rogier A. Windhorst, Jeffrey J. Puschell, Richard B. Isaacman, and Frazer N. Owen.* **285**, 515, 117-B6 (1984)
- The Jet and Filaments in Cygnus A. *R. A. Perley, J. W. Dreher, and J. J. Cowan.* **285**, L35, 115-A5 (1984)
- Spectroscopy of Extremely Distant Radio Galaxies. *Hyron Spinrad and S. Djorgovski.* **285**, L49, 121-D4 (1984)
- Radio Emission from a Type I Supernova: SN 1983.51 in NGC 5236. *R. A. Sramek, N. Panagia, and K. W. Weiler.* **285**, L59, 121-E2 (1984)
- Emission-Line Gas Associated with the Radio Lobes of the High-Luminosity Radio Source 3C 171. *T. M. Heckman, W. J. M. van Breugel, and G. K. Miley.* **286**, 509, 128-F5 (1984)
- A Search for Changing Structure in Low-Luminosity Compact Radio Sources. *Dayton L. Jones.* **287**, 33, 133-C12 (1984)
- Compact-Core-dominated Radio Emission from Bright E/S0 Galaxies. *J. M. Wrobel and D. S. Heeschen.* **287**, 41, 133-D5 (1984)
- Structural Properties of Giant H II Regions in Nearby Galaxies. *Robert C. Kennicutt, Jr.* **287**, 116, 134-B14 (1984)
- Cosmological Evolution of Radio Sources. *J. J. Condon.* **287**, 461, 139-C1 (1984)
- High-Resolution VLA Observations of the Radio Jet in NGC 6251. *R. A. Perley, A. H. Bridle, and A. G. Willis.* **54**, 291, 5-D9 (1984) (Abstr. in **276**, 799, 10-B11)
- Radio Sources: General**
- VLBI Study of 1038 + 528 A and B: Discovery of Wavelength Dependence of Peak Brightness Location. *J. M. Marcaide and I. I. Shapiro.* **276**, 56, 1-E5 (1984)
- Radio Structure of the Proto-Planetary Nebula GL 618. *Sun Kwok and R. C. Bignell.* **276**, 544, 7-E1 (1984)
- The Radio Structure of CTA 21. *Dayton L. Jones.* **276**, L5, 5-E5 (1984)
- Shell Structure in Ultracompact H II Regions. *B. E. Turner and H. E. Matthews.* **277**, 164, 12-F9 (1984)
- Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. *J. M. Benson and K. J. Johnston.* **277**, 181, 13-A1 (1984)
- The Electron Energy Spectrum Produced in Radio Sources by Turbulent, Resonant Acceleration. *Jean A. Eilek and Richard N. Henriksen.* **277**, 820, 21-B1 (1984)
- A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos.* **277**, L35, 22-E1 (1984)
- High-Resolution Observations of the Steep Spectrum Source 2147 + 145. *W. D. Cotton, F. N. Owen, B. J. Geldzahler, K. Johnston, L. Bååth, and J. Romney.* **277**, L41, 22-E6 (1984)
- 5 Gigahertz Structure and Optical Identifications of Weak Extragalactic Radio Sources. *C. R. Lawrence, C. L. Bennett, J. N. Hewitt, and B. F. Burke.* **278**, L95, 36-A12 (1984)
- Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. *Bel Campbell and Rodger I. Thompson.* **279**, 650, 45-A5 (1984)
- High-Resolution Imaging from Mauna Kea: Cygnus A. *Laird A. Thompson.* **279**, L47, 48-B2 (1984)
- Infrared Observations of the 3C 273 Jets. *J. Patrick Henry, E. E. Becklin, and C. M. Telesco.* **280**, 98, 50-B1 (1984)
- NGC 2024: Far-Infrared and Radio Molecular Observations. *Harley A. Thronson, Jr., Charles J. Lada, P. R. Schwartz, Howard A. Smith, J. Smith, W. Glaccum, D. A. Harper, and R. F. Loewenstein.* **280**, 154, 50-F5 (1984)
- The Radio Properties of the Broad Absorption-Line Quasars. *J. T. Stocke, C. B. Foltz, R. J. Weymann, and W. A. Christiansen.* **280**, 476, 55-B2 (1984)
- Relativistic Jet Meets Target: The Gamma-Rays from 3C 273. *Philip Morrison, Dana Roberts, and Alberto Sadun.* **280**, 483, 55-B9 (1984)
- The Spectral Evolution of Low-Frequency Variable Radio Sources. *Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon.* **281**, L55, 73-A4 (1984)
- VLA Observations of Collimated Outflow at NGC 7538 IRS 1. *Bel Campbell.* **282**, L27, 78-C2 (1984)
- Extended Radio Observations of the SNR CTB 109. *V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner.* **283**, 147, 87-F1 (1984)
- New Radio Observations of the Composite Supernova Remnant G29.7 - 0.3. *R. H. Becker and D. J. Helfand.* **283**, 154, 87-F9 (1984)
- A Radio Source Occultation Experiment with Comet Austin 1982g, with Unusual Results. *Imke de Pater and Wing-H. Ip.* **283**, 895, 96-F2 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason.* **284**, 512, 104-F8 (1984)
- The Evolution of Nonthermal Supernova Remnants. II. Can Radio Supernovae Become Plerions? *R. Bandiera, F. Pacini, and M. Salvati.* **285**, 134, 111-D6 (1984)
- Coordinated Multifrequency Observations of the BL Lacertae Objects Markarian 180 and Markarian 501. *S. L. Mufson, D. J. Hutter, K. R. Hackney, R. L. Hackney, C. M. Urry, R. F. Mushotzky, Y. Kondo, W. Z. Wisniewski, H. D. Aller, M. F. Aller, and P. E. Hodge.* **285**, 571, 117-G2 (1984)
- Radio Emission from a Type I Supernova: SN 1983.51 in NGC 5236. *R. A. Sramek, N. Panagia, and K. W. Weiler.* **285**, L59, 121-E2 (1984)
- Very High Resolution Observations of Compact Sources in the Direction of Supernova Remnants: G74.87 + 1.22. *Barry J. Geldzahler, David B. Shaffer, and Helmut Kühr.* **286**, 284, 125-A9 (1984)
- Redshifts of Southern Radio Sources. VI. *David L. Jauncey, Michael J. Batty, Alan E. Wright, Bruce A. Peterson, and Ann Savage.* **286**, 498, 128-E8 (1984)
- New Radio Sources at AFGL 2591: Young Cluster or Single Star? *Bel Campbell.* **287**, 334, 136-E10 (1984)
- Is There Really Evidence for Universal Rotation? *Michael F. Bientenholz and Philipp P. Kronberg.* **287**, L1, 138-C3 (1984)
- Radio Sources: Identifications**
- Submillimeter Wavelength Survey of the Galactic Plane from $l = -5^\circ$ to $l = +62^\circ$: Structure and Energetics of the Inner Disk. *M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung.* **285**, 74, 110-F14 (1984)
- Supernova Remnants in the Magellanic Clouds. *D. S. Mathewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle.* **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- Radio Sources: Lines**
- Observations of Heavy Element Radio Recombination Lines from C II Regions. *Peter R. Silverglete.* **278**, 604, 32-E1 (1984)
- Upper Limits to Magnetic Fields in C II Regions. *Peter R. Silverglete.* **279**, 694, 45-D7 (1984)
- HNCO in Molecular Clouds. *James M. Jackson, J. Thomas Armstrong, and Alan H. Barrett.* **280**, 608, 56-D13 (1984)
- The 8.7 GHz Hyperfine Line of $^3\text{He}^+$ in Galactic H II Regions. *Robert T. Rood, T. M. Bania, and T. L. Wilson.* **280**, 629, 56-F7 (1984)
- Detection of U45.379: An Intense, Peculiar Unidentified Line. *H. Suzuki, N. Kaifu, T. Miyaji, M. Morimoto, M. Ohishi, and S. Saito.* **282**, 197, 76-B1 (1984)
- Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. *Jorge Cantó, Luis F. Rodríguez, Nuria Calvet, and Russell M. Leareault.* **282**, 631, 82-A1 (1984)
- High-Latitude Molecular Clouds. *Leo Blitz, Loris Magnani, and Lee Mundy.* **282**, L9, 78-A9 (1984)
- 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. *T. B. H. Kuiper, E. N. Rodríguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann.* **283**, 106, 87-B13 (1984)
- CN in Dark Interstellar Clouds. *Richard M. Crutcher, Ed Churchwell, and L. M. Ziurys.* **283**, 668, 94-C4 (1984)
- Interpretation of Absolute Line Intensities on the NRAO 11 Meter and Other Millimeter Wave Telescopes. *M. L. Kutner, L. Mundy, and R. J. Howard.* **283**, 890, 96-E11 (1984)
- Linear Polarization of Molecular Lines at Radio Frequencies. *Shuji Deguchi and William D. Watson.* **285**, 126, 111-C12 (1984)
- $2_{11-2_{12}}$ Formaldehyde Emission from DR 21(OH). *K. J. Johnston, C. Henkel, and T. L. Wilson.* **285**, L85, 121-G7 (1984)
- The Methyl Cyanide Hot and Warm Cores in Orion: Statistical Equilibrium Excitation Models of a Symmetric-Top Molecule. *Robert B. Loren and Lee G. Mundy.* **286**, 232, 124-D10 (1984)
- A Search for 183 GHz Emission from Water in Late-Type Stars. *T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodríguez Kuiper, and P. Zimmermann.* **286**, 310, 125-C9 (1984)
- Radio Sources: Spectra**
- Radio Continuum Activity in the Elliptical Galaxy NGC 1052. *J. M. Wrobel.* **284**, 531, 104-G13 (1984)
- Spectroscopy of Extremely Distant Radio Galaxies. *Hyron Spinrad and S. Djorgovski.* **285**, L49, 121-D4 (1984)
- Radio Sources: 21 cm Radiation**
- Neutral Hydrogen in Seyfert Galaxies. *I. F. Mirabel and A. S. Wilson.* **277**, 92, 12-A3 (1984)
- Searching for the Optimal Means of Comparative H I Analysis. *Gregory D. Bothun.* **277**, 532, 17-G9 (1984)

Radio Sources: 21 cm Radiation—Continued

- The Distances and Properties of a Sample of Sc I Galaxies. Gregory D. Bothum, Marc Aaronson, Bob Schommer, John Huchra, and Jeremy Mould. **278**, 475, 31-B9 (1984)
- Evidence for High-Velocity Inflow of Neutral Hydrogen toward the Galaxy. I. F. Mirabel and R. Morris. **279**, 86, 38-A2 (1984)
- The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. L. Bottinelli, L. Gouguenheim, G. Paturel, and G. de Vaucouleurs. **280**, 34, 49-C14 (1984)
- A Successful Survey of H I in Low-Luminosity Elliptical Galaxies. George Lake and R. A. Schommer. **280**, 107, 50-B12 (1984)
- The Spin Temperature of Atomic Hydrogen in Very Low Density Gas outside of Galaxies. William D. Watson and Shuji Deguchi. **281**, L5, 65-E6 (1984)
- Direct Determination of Extragalactic Distances from the 21 Centimeter Line Width and the Method of "Sosies". G. Paturel. **282**, 382, 79-B12 (1984)
- The H I Halo in the Inner Galaxy. Felix J. Lockman. **283**, 90, 87-A11 (1984)
- The Sub-Millarcsecond Radio Structure of AO 0235 + 164. Dayton L. Jones, Lars B. Bååth, Michael M. Davis, and Stephen C. Unwin. **284**, 60, 98-E9 (1984)
- Face-on Galaxies. B. M. Lewis. **285**, 453, 116-D5 (1984)
- High-Resolution Observations of the H I Content of the Barred Spiral Galaxies NGC 3992 and NGC 4731. S. T. Gottesman, R. Ball, J. H. Hunter, Jr., and J. M. Huntley. **286**, 471, 128-C3 (1984)
- Global Redshift Quantization. W. G. Tifft and W. J. Cocke. **287**, 492, 139-E4 (1984)
- A Survey of the Latitude Structure of Galactic H I on Small Angular Scales. T. M. Bania and Felix J. Lockman. **54**, 513, 8-F9 (1984) (Abstr. in **278**, 895, 35-E13)
- H I Observations in the Virgo Cluster Area. II. A Complete, Magnitude-Limited Sample of Spiral Galaxies. George Helou, G. Lyle Hoffman, and E. E. Salpeter. **55**, 433, 17-A1 (1984) (Abstr. in **281**, 890, 72-C3)
- H I Shells, Supershells, Shell-like Objects, and "Worms". Carl Heiles. **55**, 585, 19-D1 (1984) (Abstr. in **282**, 821, 84-A11)
- Radio Sources: Variable**
- Multifrequency Observations of the BL Lacertae Object 0735 + 178. J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan. **276**, 454, 6-E2 (1984)
- Rapid Radio Variations in the Flux Density of BL Lacertae. K. J. Johnston, B. J. Geldzahler, J. H. Spencer, E. B. Waltman, W. J. Klepczynski, F. J. Josties, P. E. Angerhofer, D. R. Florkowski, D. D. McCarthy, and D. N. Matsakis. **277**, L30, 22-D11 (1984)
- Evolution of Pulsar-driven Supernova Remnants. S. P. Reynolds and R. A. Chevalier. **278**, 630, 32-G7 (1984)
- A Comparison of the Properties of Highly Polarized QSOs versus Low-Polarization QSOs. Richard L. Moore and H. S. Stockman. **279**, 465, 43-A5 (1984)
- On the Rapid Optical Variability of PKS 0129 - 164. K. Meisenheimer and H.-J. Röser. **279**, L39, 48-A7 (1984)
- The Spectral Evolution of Low-Frequency Variable Radio Sources. Brian Dennison, J. J. Broderick, S. L. O'Dell, K. J. Mitchell, Daniel R. Altschuler, H. E. Payne, and J. J. Condon. **281**, L55, 73-A4 (1984)
- Time Variability of the 87 GHz Linear Polarization and Flux Density of Active Extragalactic Objects. Richard Barvainis and C. Read Predmore. **282**, 402, 79-D6 (1984)
- Detection of a Sub-Millarcsecond Radio Component in the RS CVn System 1099. Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston. **282**, L23, 78-B12 (1984)
- An X-Ray Survey of Variable Radio Bright Quasars. Mark J. Henriksen, Francis E. Marshall, and Richard F. Mushotzky. **284**, 491, 104-E1 (1984)
- A Search for Changing Structure in Low-Luminosity Compact Radio Sources. Dayton L. Jones. **287**, 33, 133-C12 (1984)
- 5 GHz Source Variability and the Gain of the NRAO 300 Foot Telescope. C. L. Bennett, C. R. Lawrence, and B. F. Burke. **54**, 211, 4-E5 (1984) (Abstr. in **276**, 798, 10-B10)
- Relativity**
- Testing the Strong Equivalence Principle by Radio Ranging. V. M. Canuto, I. Goldman, and I. I. Shapiro. **276**, 1, 1-A6 (1984)
- The Electron Energy Spectrum Produced in Radio Sources by Turbulent, Resonant Acceleration. Jean A. Eilek and Richard N. Henriksen. **277**, 820, 21-B1 (1984)
- Limits on the Gravitational Redshift from Neutron Stars. Lee Lindblom. **278**, 364, 28-A1 (1984)

- Imperfect Fluid Cosmologies with Thermodynamics: Some Exact Solutions. A. A. Coley and B. O. J. Tupper. **280**, 26, 49-C6 (1984)
- The Production Spectrum of a Relativistic Maxwell-Boltzmann Gas. Charles D. Dermer. **280**, 328, 52-E6 (1984)
- Self-similar Gravitational Collapse in an Expanding Universe. James A. Fillmore and Peter Goldreich. **281**, 1, 61-A6 (1984)
- Self-similar Spherical Voids in an Expanding Universe. James A. Fillmore and Peter Goldreich. **281**, 9, 61-A14 (1984)
- Static Structure of General Relativistic, Partially Degenerate, Self-gravitating, Lepton Configurations. I. Numerical Scheme. W. Y. Chau, Kayll Lake, and J. Stone. **281**, 560, 68-F2 (1984)
- On the Stability of a New Relativistic Kinetic Equation. Henry E. Kundrup. **282**, 361, 79-A5 (1984)
- On Test Particles in General Relativity. Thomas W. Noonan. **283**, 321, 89-E1 (1984)
- Spectra from Pair-Equilibrium Plasmas. Andrzej A. Zdziarski. **283**, 842, 96-B5 (1984)
- The Statistics of Gravitational Lenses: The Distributions of Image Angular Separations and Lens Redshifts. Edwin L. Turner, Jeremiah P. Ostriker, and Richard J. Gott III. **284**, 1, 98-A6 (1984)
- Collapse of Anisotropic Spheres in General Relativity: An Analytical Model. J. M^a. Ibañez. **284**, 381, 102-B4 (1984)
- Gravitation in the Weak-Field Limit. Herbert J. Rood. **284**, 407, 130-D2 (1984)
- Pair Production Rates in Mildly Relativistic, Magnetized Plasmas. Michael L. Burns and Alice K. Harding. **285**, 747, 119-F1 (1984)
- Cosmic Rays and the Emission-Line Regions of Active Galactic Nuclei. G. J. Ferland and R. F. Mushotzky. **286**, 42, 122-D4 (1984)
- Enhancement of Thermonuclear Reaction Rate due to Screening by Relativistic Degenerate Electrons: Long-Range Correlation Effect. Setsuo Ichimaru and Kenichi Utsumi. **286**, 363, 125-G6 (1984)
- Limits on a Stochastic Gravitational Wave Background from Observations of Terrestrial and Solar Oscillations. S. P. Boughn and J. R. Kuhn. **286**, 387, 127-C9 (1984)
- Some Observable Effects in Relativistic Cosmology with Non-Perfect Fluids. L. J. Goicoechea and J. L. Sanz. **286**, 392, 127-C14 (1984)
- Long-Term Post-Newtonian Effects in a Binary System. Miquel Portilla and Ramon Lapidra. **286**, 633, 130-B3 (1984)
- Monte Carlo Shock-like Solutions to the Boltzmann Equation with Collective Scattering. Donald C. Ellison and David Eichler. **286**, 691, 130-F5 (1984)
- Analytical Models of Neutron Star Envelopes. Lars Hernquist and James H. Applegate. **287**, 244, 135-E8 (1984)
- Planar Numerical Cosmology. II. The Difference Equations and Numerical Tests. Joan Centrella and James R. Wilson. **54**, 229, 4-F8 (1984) (Abstr. in **276**, 798, 10-B10)
- A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration. John F. Hawley, Larry L. Smarr, and James R. Wilson. **55**, 211, 13-G13 (1984) (Abstr. in **280**, 938, 60-B2)
- Relativistic Electron Transport in a Quantizing Magnetic Field. Lars Hernquist. **56**, 325, 27-C7 (1984) (Abstr. in **285**, 875, 121-A6)
- Rotation**
- Criteria for Collapse and Fragmentation of Rotating, Isothermal Clouds. Shoken M. Miyama, Chushiro Hayashi, and Shinji Narita. **279**, 621, 44-E11 (1984)
- Gamma-Rays from Rotating Black Holes. N. Panchapakesan and Vijay Prakash. **280**, 848, 59-A14 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Mode Transition between Steady and Oscillatory Dynamos as a Function of Dynamo Strength and Anisotropic Turbulent Magnetic Diffusivity. Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu. **283**, 870, 96-D5 (1984)
- Rotational Mode Splitting about an Inclined Axis. Morris L. Aizenman, Carl J. Hansen, John P. Cox, and W. Dean Pesnell. **286**, L43, 132-D13 (1984)
- Is There Really Evidence for Universal Rotation? Michael F. Bientenholz and Philipp P. Kronberg. **287**, L1, 138-C3 (1984)
- Shock Waves**
- A High-Resolution Study of Herbig-Haro Objects 1 and 2. L. Hartmann and J. C. Raymond. **276**, 560, 7-F4 (1984)
- Radiative Shock-Wave Theory. I. Chemical Abundance Diagnostics and Galactic Abundance Gradients. Michael A. Dopita, Luc Binette, Sandro D'Oroico, and Piero Benvenuti. **276**, 653, 8-F2 (1984)
- A Numerical Study of the Stability of Radiative Shocks. James N. Imamura, Michael T. Wolff, and Richard H. Durisen. **276**, 667, 8-G2 (1984)
- A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. John F. Hawley, Larry L. Smarr, and James R. Wilson. **277**, 296, 14-B9 (1984)
- Transient Behavior of a Flare-associated Solar Wind. I. Gas Dynamics in a Radial Open Field Region. Fukuo Nagai. **277**, 379, 15-A8 (1984)

- On the Theory of Cosmic-Ray-Mediated Shocks with Variable Compression Ratio. *David Eichler*. **277**, 429, 15-E7 (1984)
- On the Dynamics in Evaporating Cloud Envelopes. *John L. Giuliani, Jr.* **277**, 605, 18-E14 (1984)
- Coronal [Fe] Lines in Supernova Remnants: Nonequilibrium Ionization Models. *Richard G. Teske*. **277**, 832, 21-B13 (1984)
- Photoelectric Observations of Chromospheric Sunspot Oscillations. II. Propagation Characteristics. *Bruce W. Lites*. **277**, 874, 21-E13 (1984)
- Transient Behavior of Flare-associated Solar Wind. II. Gas Dynamics in a Nonradial Open Field Region. *Fukuo Nagai*. **278**, 841, 35-A13 (1984)
- Stability of Self-similar Flow: Correct Form of the Basic Equations and of the Shock Boundary Conditions. *Bernard Gaffet*. **279**, 419, 41-E2 (1984)
- Associations between Coronal Mass Ejections and Metric Type II Bursts. *N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels*. **279**, 839, 47-A4 (1984)
- Colliding Winds: Interaction Regions with Strong Heat Conduction. *James N. Imamura and Roger A. Chevalier*. **280**, 313, 52-D5 (1984)
- The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. *S. Beckwith, S. C. Beck, and J. Gatley*. **280**, 648, 57-A1 (1984)
- The Interaction of Crab-like Supernova Remnants with Their Surroundings. *Roger A. Chevalier*. **280**, 797, 58-E5 (1984)
- The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. *Joseph E. Borovsky, Morris B. Pongratz, Robert A. Roussel-Dupré, and Tai-Ho Tan*. **280**, 802, 58-E10 (1984)
- Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. *G. M. Mason, G. Gloeckler, and D. Hovestadt*. **280**, 902, 59-E14 (1984)
- Self-similar Magnetohydrodynamics. III. The Subset of Spherically Symmetric Gasdynamic Flows. *B. C. Low*. **281**, 381, 65-B1 (1984)
- The Nature of the Filaments Northeast of the Supernova Remnant IC 443. *Robert A. Fesen*. **281**, 658, 69-F8 (1984)
- A New Similarity Solution for Reverse Shocks in Supernova Remnants. *A. J. S. Hamilton and C. L. Sarazin*. **281**, 682, 70-A5 (1984)
- Thermal Evaporation of Spherical Clouds: Effects of Viscous Stresses. *B. T. Draine and J. L. Giuliani, Jr.* **281**, 690, 70-A13 (1984)
- Radiative Shock Wave Theory. III. The Nature of the Optical Emission in Young Supernova Remnants. *Michael A. Dopita, Luc Binette, and Ian R. Tuohy*. **282**, 142, 75-D14 (1984)
- Type II Solar Radio Bursts, Interplanetary Shocks, and Energetic Particle Events. *H. V. Cane and R. G. Stone*. **282**, 339, 77-E4 (1984)
- Galactic Detonation Waves: Numerical Models Illustrating the Transition from Deterministic to Stochastic. *Wendy L. Freedman, Barry F. Madore, and Sanju Mehta*. **282**, 412, 79-E5 (1984)
- CO Line Emission from Shock Waves in Molecular Clouds. *B. T. Draine and W. G. Roberge*. **282**, 491, 80-E1 (1984)
- Shock Acceleration of Nuclei and Electrons in the Heliosphere beyond 24 AU. *K. R. Pyle, J. A. Simpson, A. Barnes, and J. D. Mihalov*. **282**, L107, 85-E9 (1984)
- Scattering of Shock Waves by a Spherical Cloud. *Satoru Ikeuchi and Lyman Spitzer, Jr.* **283**, 825, 96-A1 (1984)
- The Time Development of a Blast Wave with Shock-heated Electrons. *Richard J. Edgar and Donald P. Cox*. **283**, 833, 96-A9 (1984)
- X-Ray Emission from Supernova Remnants. II. The Effect of Remnant Structure on Nonequilibrium X-Ray Spectra. *A. J. S. Hamilton and C. L. Sarazin*. **284**, 601, 105-F2 (1984)
- X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. *John J. Nugent, Steven H. Pravdo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler*. **284**, 612, 105-F13 (1984)
- Temperature Relaxation in Supernova Remnants, Revisited. *Hiroshi Itoh*. **285**, 601, 118-C7 (1984)
- A Model for the Surface Brightness of a Turbulent Low Mach Number Jet. I. Theoretical Development and Application to 3C 31. *G. V. Bicknell*. **286**, 68, 122-F2 (1984)
- Shock Waves in Mira Variables. I. Emission-Line Spectra. *M. W. Fox, P. R. Wood, and M. A. Dopita*. **286**, 337, 125-E8 (1984)
- Monte Carlo Shock-like Solutions to the Boltzmann Equation with Collective Scattering. *Donald C. Ellison and David Eichler*. **286**, 691, 130-F5 (1984)
- Heating and Cooling in Reverse Shocks into Pure Heavy-Element Supernova Ejecta. *A. J. S. Hamilton and C. L. Sarazin*. **287**, 282, 136-A10 (1984)
- Helical Twisting on an Adiabatically Expanding Jet. I. Propagation and Temporal Growth. *Philip E. Hardee*. **287**, 523, 139-G10 (1984)
- Effects of Shocks on the Sulfur Chemistry of a Dense Interstellar Cloud. *George F. Mitchell*. **287**, 665, 141-E6 (1984)
- Reevaluation of the Rate Constants for the Reactions $C^+ + H_2 \rightarrow CH^+ + H$ and $CH^+ + H \rightarrow C^+ + H_2$ at Temperatures Characteristic of Ambient and Shocked Diffuse Interstellar Clouds. *Walter J. Chesnavich, Victor E. Akin, and Douglas A. Webb*. **287**, 676, 141-F3 (1984)
- The H51 α Emission Associated with the Shocked Gas in Orion-KL. *T. Hasegawa and K. Akabane*. **287**, L91, 145-E14 (1984)
- Effects of Shocks on the Molecular Composition of a Dense Interstellar Cloud. *George F. Mitchell*. **54**, 81, 2-B12 (1984) (Abstr. in **275**, 928, 147-F1)
- Time Series Infrared Spectroscopy of Mira Variables. II. CO $\Delta_v = 3$ in Eight Mira Variables and One SRa Variable. *Kenneth H. Hinkle, Werner W. G. Scharlach, and Donald N. B. Hall*. **56**, 1, 22-A2 (1984) (Abstr. in **283**, 905, 96-F12)
- Sky Photographs**
- Images in the Rocket Ultraviolet: Photometry of M101. *Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher*. **277**, 542, 18-A5 (1984)
- The S201 Far-Ultraviolet Imaging Survey. II. A Field in Cygnus. *George R. Carruthers and Thornton Page*. **54**, 271, 5-C2 (1984) (Abstr. in **276**, 799, 10-B11)
- The S201 Far-Ultraviolet Imaging Survey. III. A Field in Sagittarius. *George R. Carruthers and Thornton Page*. **55**, 101, 12-A3 (1984) (Abstr. in **279**, 911, 47-G2)
- Solar System: General**
- Comet Cernis: Icy Grains at Last? *Martha S. Hanner*. **277**, L75, 23-A1 (1984)
- 26Al in the Interstellar Medium. *Donald D. Clayton*. **280**, 144, 50-E8 (1984)
- Mass Loss from the Proto-Sun: Formation and Evolution of the Solar Nebula. *B. M. P. Trivedi*. **281**, 375, 65-A9 (1984)
- On the Tidal Interaction between Protoplanets and the Primordial Solar Nebula. I. Linear Calculation of the Role of Angular Momentum Exchange. *John Papaloizou and D. N. C. Lin*. **285**, 818, 120-D4 (1984)
- Transport of Dust and Vapor and Chemical Fractionation in the Early Protosolar Cloud. *G. E. Morfill and H. J. Volk*. **287**, 371, 137-A7 (1984)
- Spectrophotometry**
- Spectrophotometry of Two Complete Samples of Flat Radio Spectrum Quasars. *E. Joseph Wampler, C. Martin Gaskell, William L. Burke, and Jack A. Baldwin*. **276**, 403, 6-A5 (1984)
- Spectrophotometry of the White Dwarfs. *Jesse L. Greenstein*. **276**, 602, 8-B6 (1984)
- The 3000 Å Bump in Quasars. *J. B. Oke, G. A. Shields, and D. G. Korycansky*. **277**, 64, 11-F1 (1984)
- The Ultraviolet Spectrum of a Strongly Reddened, High-Excitation Herbig-Haro Object. *K. H. Böhm and E. Böhm-Vitense*. **277**, 216, 13-C8 (1984)
- Spectrophotometry and Image Analysis of the Nebulosity around the Low-Redshift Quasar 0241 + 622. *W. Romanishin, Holland Ford, Robin Ciardullo, and Bruce Margon*. **277**, 487, 17-D5 (1984)
- Ultraviolet Spectroscopy of the Dwarf Nova U Geminorum. *R. J. Panek and A. V. Holm*. **277**, 700, 19-F11 (1984)
- Absolute Spectrophotometry of Wolf-Rayet Stars from 1200 to 7000 Å: A Cautionary Tale. *Catharine D. Garmany, Philip Massey, and Peter S. Conti*. **278**, 233, 26-E3 (1984)
- Near-Infrared Spectrophotometry of Crab Nebula Filaments. *Richard B. C. Henry, Gordon M. MacAlpine, and Robert P. Kirshner*. **278**, 619, 32-F8 (1984)
- 2 to 20 Micron Observations of Mass Loss from Early-Type Stars. *David C. Abbott, C. M. Telesco, and Sidney C. Wolff*. **279**, 225, 39-D14 (1984)
- The Nature of Symbiotic Stars. *Scott J. Kenyon and Ronald F. Webbink*. **279**, 252, 39-F14 (1984)
- Variability of the Emission-Line Spectra and Optical Continua of Seyfert Galaxies. II. *Bradley M. Peterson, Craig B. Foltz, D. Michael Crenshaw, Karie A. Meyers, and Paul L. Byard*. **279**, 529, 43-E13 (1984)
- Optical Spectrophotometry of the M87 Jet and Its Environs. *William C. Keel*. **279**, 550, 43-G7 (1984)
- 3C 324—An Extremely Distant Cluster Radio Galaxy. *Hyron Spinrad and S. Djorgovski*. **280**, L9, 54-C11 (1984)
- IUE Observations of High-Redshift Quasars. *Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman*. **281**, 76, 61-F12 (1984)
- A Statistical Study of the Properties of Radio Galaxies. *Robert R. J. Antonucci*. **281**, 112, 62-B9 (1984)
- Temperatures and Surface Gravities of DB White Dwarfs. *J. B. Oke, V. Weidemann, and D. Koester*. **281**, 276, 64-A1 (1984)
- Absolute Spectrophotometry of Northern Wolf-Rayet Stars: How Similar Are the Colors? *Philip Massey*. **281**, 789, 71-B5 (1984)
- Spectrophotometry of Young Supernova Remnants. *Michael A. Dopita and Ian R. Tuohy*. **282**, 135, 75-D7 (1984)
- Observations of the Stellar Radiation Field at 975 Å. *Chet B. Opal and*

Spectrophotometry—Continued

- Charles S. Weller. **282**, 445, 80-A10 (1984)
- New Spectrophotometry of the Extremely Cool Proper Motion Star LHS 2924. James Liebert, Todd A. Boroson, and Mark S. Giampapa. **282**, 758, 83-C13 (1984)
- Discovery of a New Gravitational Lens. S. Djorgovski and H. Spinrad. **282**, L1, 78-A2 (1984)
- Spectroscopy over a Range of 5 Magnitudes in NGC 6752. R. A. Bell, James E. Hesser, and R. D. Cannon. **283**, 615, 93-F3 (1984)
- Far-Ultraviolet Spectrophotometry of Two Very Hot O Type Subdwarfs. J. S. Drilling, J. B. Holberg, and D. Schönberner. **283**, L67, 97-D3 (1984)
- Spectrophotometry of Intermediate-Redshift Quasars. Alan Uomoto. **284**, 497, 104-E7 (1984)
- The Ionization Structure of Planetary Nebulae. IV. NGC 6853. Timothy Barker. **284**, 589, 105-E2 (1984)
- Infrared Spectrophotometry of the Most Luminous Quasar S5 0014 + 81. Helmut Kühr, Christopher W. McAlary, Richard J. Rudy, Peter A. Strittmatter, and George H. Rieke. **284**, L5, 103-A6 (1984)
- NGC 7213: A Key to the Nature of Liners? Alexei V. Filippenko and J. P. Halpern. **285**, 458, 116-D10 (1984)
- Spectroscopy and Spectrophotometry of Distant Halo RR Lyrae Stars. A. Saha and J. B. Oke. **285**, 688, 119-A9 (1984)
- Abundance Estimates for the Distant Anticenter Clusters King 8 and Be 19. C. A. Christian. **286**, 552, 129-C1 (1984)
- Spectrophotometry of Compact Embedded Infrared Sources in the 0.6–1.0 Micron Wavelength Region. P. J. McGregor, S. E. Persson, and J. G. Cohen. **286**, 609, 129-G4 (1984)
- A Medium-Bright Quasar Sample: New Quasar Surface Densities in the Magnitude Range $16.4 < B < 17.65$. Kenneth J. Mitchell, Archibald Warnock III, and Peter D. Usher. **287**, L3, 138-C5 (1984)
- The 1984 Supernova in NGC 3169: Evidence for a Superwind. Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz. **287**, L69, 145-D7 (1984)
- Spectrophotometry of the RS Canum Venaticorum Stars. II. A Study of Seven Systems from 4000–11000 Angstroms. Steven N. Shore and Saul J. Adelman. **54**, 151, 2-G8 (1984) (Abstr. in **275**, 929, 147-F2)
- Energy Distributions for 12 Solar-Type Stars and Synthetic UVB Photometry of the Sun. Benjamin J. Taylor. **54**, 167, 3-B1 (1984) (Abstr. in **275**, 930, 147-F3)
- An Augmented System of Secondary Standards for Bright-Star Spectrophotometry. Benjamin J. Taylor. **54**, 259, 5-B1 (1984) (Abstr. in **276**, 799, 10-B11)
- A Library of Stellar Spectra. George H. Jacoby, Deidre A. Hunter, and Carol A. Christian. **56**, 257, 25-F6 (1984) (Abstr. in **284**, 870, 108-E2)
- Spiral Structure:** see **Galaxies: Structure**
- SS Cygni Stars:** see **U Geminorum**
- Stars: Abundances**
- AM-1: A Very Distant Globular Cluster. Marc Aaronson, Robert A. Schommer, and Edward W. Olszewski. **276**, 221, 3-C5 (1984)
- LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? D. Schönberner and J. S. Drilling. **276**, 229, 3-D1 (1984)
- LMC Blue Globular Clusters Containing Cepheids. I. NGC 1856. P. W. Hodge and S.-O. Lee. **276**, 509, 7-B7 (1984)
- Spectrophotometry of the White Dwarfs. Jesse L. Greenstein. **276**, 602, 8-B6 (1984)
- A Photometric Comparison of Late-Type Cluster Supergiants in the Magellanic Clouds and the Galaxy. P. J. McGregor and A. R. Hyland. **277**, 149, 12-E7 (1984)
- Deep CCD Photometry in Globular Clusters. I. The Main Sequence of M4. Harvey B. Richer and G. G. Fahlgren. **277**, 227, 13-D5 (1984)
- Lithium Abundances and Chromospheric Activity. I. Empirical Results. Mark S. Giampapa. **277**, 235, 13-D13 (1984)
- The Anticorrelation of Cyanogen and CH on the Giant Branch of 47 Tucanae. John Norris, K. C. Freeman, and G. S. Da Costa. **277**, 615, 18-F10 (1984)
- The Spectrum of V348 Sagittarii. Oved Dahari and Donald E. Osterbrock. **277**, 648, 14-B7 (1984)
- On the Composition of the Stellar Winds of the Most Massive Stars: 100 M_{\odot} to 2200 M_{\odot} . D. S. P. Dearborn and J. B. Blake. **277**, 783, 20-F3 (1984)
- Carbon in the Cool DC and C₂ White Dwarfs: Dredge-up in Compositionally Stratified Envelopes. G. Fontaine, B. Villeneuve, F. Wesemael, and G. Wegner. **277**, L61, 22-F12 (1984)
- The Stellar Content and Metallicity of the NGC 5128 Globular Cluster. Jay A. Frogel. **278**, 119, 25-C11 (1984)
- On the Metallicity of Blue Horizontal-Branch Stars in M4 and NGC 6397. K. Kodaira and A. G. Davis Philip. **278**, 201, 26-B12 (1984)
- High-Dispersion Spectroscopic Investigation of Field Horizontal-Branch, High-Luminosity, and Main-Sequence Stars. K. Kodaira and A. G. Davis Philip. **278**, 208, 26-C6 (1984)
- Did the First Metals in Our Galaxy Come from Virgo Cluster Supernovae? George Wallerstein. **278**, 663, 33-B12 (1984)
- Effective Temperatures and Luminosities of Very Hot O Type Subdwarfs. D. Schönberner and J. S. Drilling. **278**, 702, 33-E9 (1984)
- Nitrogen Abundances in Disk and Halo Dwarfs. Jocelyn Tomkin and David L. Lambert. **279**, 220, 39-D8 (1984)
- Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. Monique Tassoul and Jean-Louis Tassoul. **279**, 384, 41-B9 (1984)
- HD 46703: A High-Luminosity Population II F-Type Star. R. Earle Luck and Howard E. Bond. **279**, 729, 45-G2 (1984)
- The Close Binary Central Star of the Planetary Nebula Abell 41: A Helium-rich Subdwarf Primary. Richard F. Green, James Liebert, and F. Wesemael. **280**, 177, 51-A1 (1984)
- The Clusters of M33. J. G. Cohen, S. E. Persson, and L. Searle. **281**, 141, 62-D10 (1984)
- Metal Abundances of Galactic Globular Clusters. Horace A. Smith. **281**, 148, 62-E3 (1984)
- The Chemical Composition of Globular Clusters: Global Trends. Catherine A. Pilachowski. **281**, 614, 69-C6 (1984)
- Effective Temperatures and Surface Gravities of Metal-Line A Stars. M. C. Lane and John B. Lester. **281**, 723, 70-D7 (1984)
- Oxygen Isotopes in the Atmospheres of Betelgeuse and Antares. Michael J. Harris and David L. Lambert. **281**, 739, 70-E9 (1984)
- Luminosity-dependent Line Ratios in Disks of Spiral Galaxies. Vera C. Rubin, W. Kent Ford, Jr., and Bradley C. Whitmore. **281**, L21, 65-F6 (1984)
- The Main-Sequence Turnoff of the Metal-rich Globular Cluster NGC 6171. G. S. Da Costa, J. R. Mould, and S. Ortolani. **282**, 125, 75-C9 (1984)
- The Lithium Abundance: Constraints on Stellar Evolution. G. Michaud, G. Fontaine, and G. Beaudet. **282**, 206, 76-B10 (1984)
- Abundances of Distant Classical Cepheid Variables. Hugh C. Harris and Catherine A. Pilachowski. **282**, 655, 82-B13 (1984)
- The Abundance of Lithium in the Old Galactic Cluster NGC 7789. Catherine A. Pilachowski, Jeremy R. Mould, and Michael J. Siegel. **282**, L17, 78-B7 (1984)
- Laboratory Submillimeter Transition Frequencies of ⁷LiH and ⁶LiH. Grant M. Plummer, Eric Herbst, and Frank C. De Lucia. **282**, L113, 85-F1 (1984)
- The ¹²C/¹³C Ratio of the Carbon Star V460 Cygni Revisited. Irene R. Little-Marengo and Stephen J. Little. **283**, 188, 88-B2 (1984)
- Lithium in Late-Type Giants. III. The Weak G Band Giants. David L. Lambert and Scott R. Sawyer. **283**, 192, 88-B6 (1984)
- The Lithium Abundance of Hyades Main-Sequence Stars. Roger Cayrel, Giusa Cayrel de Strobel, Bruce Campbell, and Werner Däppen. **283**, 205, 88-C5 (1984)
- High-Resolution Soft X-Ray Spectra of Scorpius X-1: The Structure of Circumscribed Accreting Material. Steven M. Kahn, Frederick D. Seward, and Tomasz Chlebowski. **283**, 286, 89-B7 (1984)
- Spectroscopy over a Range of 5 Magnitudes in NGC 6752. R. A. Bell, James E. Hesser, and R. D. Cannon. **283**, 615, 93-F3 (1984)
- Color-Magnitude Diagram Photometry of the LMC Red Cluster NGC 1978. Edward W. Olszewski. **284**, 108, 99-B11 (1984)
- Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson. **284**, 223, 100-D14 (1984)
- Analyses of the Visual Spectra of White Dwarfs Containing Carbon. G. Wegner and F. H. Yackovich. **284**, 257, 100-G6 (1984)
- The H⁺ Flux Peak and the Hydrogen Abundance in N Type Carbon Stars. J. H. Goebel and H. R. Johnson. **284**, L39, 109-B9 (1984)
- The Ultra-Metal-deficient (Population III?) Red Giant CD – 38° 245. M. S. Bessell and John Norris. **285**, 622, 118-C11 (1984)
- Oxygen Isotopic Abundances in the Atmospheres of Seven Red Giant Stars. Michael J. Harris and David L. Lambert. **285**, 674, 118-G7 (1984)
- New Results for HD 161796. J. D. Fernie and R. F. Garrison. **285**, 698, 119-B5 (1984)
- Thermal and Maser Molecular Lines from the Envelope of IRC + 10216. Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. Johansson, and B. E. Turner. **286**, 276, 125-A1 (1984)
- Helium Content of the Population II Binary System CM Draconis. Bohdan Paczyński and Ryszard Sienkiewicz. **286**, 332, 125-E3 (1984)
- Abundance Estimates for the Distant Anticenter Clusters King 8 and Be 19. C. A. Christian. **286**, 552, 129-C1 (1984)
- Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi. **286**, 644, 130-B14 (1984)
- Magnetic Fields in the Radiative Interior of Stars. II. Forced Convection and the ⁷Li Abundance. E. N. Parker. **286**, 677, 130-E5 (1984)
- The Resonance Lines of Hg II in IUE Spectra of Chemically Peculiar Stars. David S. Leckrone. **286**, 725, 131-A14 (1984)
- An Analysis by Wavelength Coincidence Statistics of the Ultraviolet

- Spectrum of Kappa Cancri. *George T. Chjonacki, Charles R. Cowley, and Donald J. Bord.* **286**, 736, 131-B11 (1984)
- A Search for Cyanogen Variations on the Lower Giant Branch of M3. *John Norris and Graeme H. Smith.* **287**, 255, 135-F5 (1984)
- Old Stellar Populations. I. A Spectroscopic Comparison of Galactic Globular Clusters, M31 Globular Clusters, and Elliptical Galaxies. *David Burstein, S. M. Faber, C. M. Gaskell, and N. Krumm.* **287**, 586, 140-E5 (1984)
- Main-Sequence B Stars with Strong Winds in the Core of NGC 6231. *Derck Massa, Blair D. Savage, and Joseph P. Cassinelli.* **287**, 814, 143-B9 (1984)
- Metal Abundances in the Hot DA White Dwarfs Wolf 1346 and Feige 24. *F. Wesemael, R. B. C. Henry, and H. L. Shipman.* **287**, 868, 143-F11 (1984)
- Magnesium, Silicon, and Iron Abundances and the Cluster Metallicity Scale. *Douglas Geisler.* **287**, L85, 145-E9 (1984)
- The Globular Cluster System of the Galaxy. III. Measurements of Radial Velocity and Metallicity for 60 Clusters and a Compilation of Metallicities for 121 Clusters. *Robert Zinn and Michael J. West.* **55**, 45, 11-D4 (1984) (Abstr. in **279**, 910, 47-G1)
- Stars: Accretion**
- PG 1012 - 029: A High-Excitation Eclipsing Cataclysmic Variable. *William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green.* **276**, 233, 3-D5 (1984)
- A Numerical Study of the Stability of Radiative Shocks. *James N. Imamura, Michael T. Wolff, and Richard H. Durisen.* **276**, 667, 8-G2 (1984)
- CPD - 48°1577: The Brightest Known Cataclysmic Variable. *R. F. Garrison, R. E. Schild, W. A. Hiltner, and W. Krzeminski.* **276**, L13, 5-E13 (1984)
- A Numerical Study of Nonspherical Black Hole Accretion. I. Equations and Test Problems. *John F. Hawley, Larry L. Smarr, and James R. Wilson.* **277**, 296, 14-B9 (1984)
- Magnetic Field Instabilities in Accretion Disks. *L. Stella and R. Rosner.* **277**, 312, 14-C11 (1984)
- Ultraviolet Spectroscopy of the Dwarf Nova U Geminorum. *R. J. Panek and A. V. Holm.* **277**, 700, 19-F11 (1984)
- The Nonaxisymmetric Baroclinic Instability in Thin Accretion Disks. *W. Cabot.* **277**, 806, 21-A1 (1984)
- Boundary Layers in Cataclysmic Variables: The HEAO 1 X-Ray Constraints. *Kenneth A. Jensen.* **278**, 278, 27-A10 (1984)
- Millisecond Variability of Cygnus X-1. *J. F. Meekins, K. S. Wood, R. L. Hedler, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman.* **278**, 288, 27-B6 (1984)
- Polarized Radiation from Hot Plasmas and Applications to AM Herculis Binaries. II. Effect of Collisions and Thomson Scattering. *P. E. Barrett and G. Channugam.* **278**, 298, 27-C2 (1984)
- Hydrodynamic Ejection of Bipolar Flows from Objects Undergoing Disk Accretion: T Tauri Stars, Massive Pre-Main-Sequence Objects, and Cataclysmic Variables. *Michael V. Torbett.* **278**, 318, 27-D10 (1984)
- Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Magnetosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. *R. F. Elsner and F. K. Lamb.* **278**, 326, 27-E4 (1984)
- Gravitational Radiation from Accreting Neutron Stars. *Robert V. Wagoner.* **278**, 345, 27-F9 (1984)
- On the Mechanism of Decelerating the Gas Infalling onto Magnetized Neutron Stars. *A. Braun and R. Z. Yahel.* **278**, 349, 27-F13 (1984)
- Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. *A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway.* **278**, 369, 28-A6 (1984)
- Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. *F. A. Córdova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire.* **278**, 739, 34-A9 (1984)
- Thermal Evolution of Accreting Neutron Stars. *Masayuki Y. Fujimoto, Tomoyuki Hanawa, Icko Iben, Jr., and M. B. Richardson.* **278**, 813, 34-F13 (1984)
- The Nature of Symbiotic Stars. *Scott J. Kenyon and Ronald F. Webbink.* **279**, 252, 39-F14 (1984)
- On the Formation of Stars from Disk Accretion. *J. A. Mercer-Smith, A. G. W. Cameron, and R. I. Epstein.* **279**, 363, 41-A2 (1984)
- Local Stability of Thick Accretion Disks. I. Basic Equations and Parallel Perturbations in the Negligible Viscosity Case. *Marek A. Abramowicz, Mario Livio, Tsvi Piran, and Paul J. Wiita.* **279**, 367, 41-A6 (1984)
- Hydraulic Jumps in "Viscous" Accretion Disks. *F. Curtis Michel.* **279**, 807, 46-E11 (1984)
- Two-Temperature Model of Spherical Accretion onto a Black Hole. *M. Colpi, L. Maraschi, and A. Treves.* **280**, 319, 52-D11 (1984)
- An Unprecedented UV/Optical Flare in TV Columbae. *Paula Szkody and Mario Mateo.* **280**, 729, 57-F13 (1984)
- Models of the Hard X-Ray Spectrum of AM Herculis and Implications for the Accretion Rate. *J. H. Swank, A. C. Fabian, and R. R. Ross.* **280**, 734, 57-G3 (1984)
- Opacities for Comptonization Plus Emission and Absorption. *Martin A. Schweizer.* **280**, 809, 58-F3 (1984)
- Gamma-Rays from Rotating Black Holes. *N. Panchapakesan and Vijay Prakash.* **280**, 848, 59-A14 (1984)
- A Formula for the Shakura-Sunyaev Turbulent Viscosity Parameter. *V. M. Canuto, I. Goldman, and O. Hubickyj.* **280**, L55, 60-E6 (1984)
- The Appearance, Number, and History of Highly Compact Binary Systems in Globular Clusters. *Julian H. Krolik.* **282**, 452, 80-B4 (1984)
- The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. *J. H. Krolik, A. Meiksin, and P. C. Joss.* **282**, 466, 80-C4 (1984)
- Conservative Mass Transfer. II. The Effective Perturbing Force: Equations of Motion for the Eccentricity and Orbital Period. *John J. Matese and Daniel P. Whitmire.* **282**, 522, 80-G4 (1984)
- High-Resolution Soft X-Ray Spectra of Scorpius X-1: The Structure of Circumscribed Accreting Material. *Steven M. Kahn, Frederick D. Seward, and Tomasz Chlebowski.* **283**, 286, 89-B7 (1984)
- SMC X-1 Variability Observed from HEAO 1. *D. E. Gruber and R. E. Rothschild.* **283**, 546, 92-G1 (1984)
- Evidence for a High-Temperature Accretion Region in Algol-Type Binary Systems. *Geraldine J. Peters and Ronald S. Polidan.* **283**, 745, 95-B1 (1984)
- Black Hole Accretion Disks: Coronal Stabilization of the Lightman-Eardley Instability. *James A. Ionson and Max Kuperus.* **284**, 389, 102-B12 (1984)
- Optically Thick, Time-dependent Spherical Accretion onto a Black Hole. I. Equations and Numerical Methods. *Peter Vitello.* **284**, 394, 102-C3 (1984)
- Infrared Emission from Accretion Disks: Detectability and Variability. *J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke.* **284**, 745, 107-B9 (1984)
- Comparison of the X-Ray Observations of the AM Herculis Objects to Theory. *James N. Imamura.* **285**, 223, 112-D2 (1984)
- Lateral Propagation of the Helium Shell Flash on an Accreting Neutron Star. *Toshiya Nozakura, Satoru Ikeuchi, and Masayuki Y. Fujimoto.* **286**, 221, 124-C13 (1984)
- Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. *Ken'ichi Nomoto, Friedrich-K. Thieleman, and Koichi Yokoi.* **286**, 644, 130-B14 (1984)
- Feige 24: Wind/Flare Accretion by a Hot Dazl Degenerate. *E. M. Sion and S. G. Starrfield.* **286**, 760, 131-D7 (1984)
- Transport of Dust and Vapor and Chemical Fractionation in the Early Protosolar Cloud. *G. E. Morfill and H. J. Völk.* **287**, 371, 137-A7 (1984)
- The Evolution of the Inner Regions of Viscous Accretion Disks Surrounding Neutron Stars. *Ronald E. Taam and D. N. C. Lin.* **287**, 761, 142-E12 (1984)
- On the Overstability of Axisymmetric Oscillations in Thin Accretion Disks. *G. R. Blumenthal, L. T. Yang, and D. N. C. Lin.* **287**, 774, 142-F11 (1984)
- X-Rays from Accretion of Red Giant Winds. *M. Jura and D. J. Helfand.* **287**, 785, 142-G8 (1984)
- The Evolution of the Optical Spectrum of the Dwarf Nova SS Cygni over One Complete Outburst Cycle. *John T. Clarke, Debbie Capel, and Stuart Bowyer.* **287**, 845, 143-D14 (1984)
- A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration. *John F. Hawley, Larry L. Smarr, and James R. Wilson.* **55**, 211, 13-G13 (1984) (Abstr. in **280**, 938, 60-B2)
- The Vertical Structure and Stability of Alpha Model Accretion Disks. *J. K. Cannizzo and J. C. Wheeler.* **55**, 367, 16-A2 (1984) (Abstr. in **281**, 890, 72-C3)
- Stars: Atmospheres**
- GD 323: A White Dwarf with a Stratified H/He Atmosphere? *James Liebert, F. Wesemael, E. M. Sion, and G. Wegner.* **277**, 692, 19-F3 (1984)
- The Chromospheric Hypothesis for the T Tauri Phenomenon. *Nuria Calvet, Gibor Basri, and Leonard V. Kuhi.* **277**, 725, 20-A11 (1984)
- On the Metallicity of Blue Horizontal-Branch Stars in M4 and NGC 6397. *K. Kodaira and A. G. Davis Philip.* **278**, 201, 26-B12 (1984)
- High-Dispersion Spectroscopic Investigation of Field Horizontal-Branch, High-Luminosity, and Main-Sequence Stars. *K. Kodaira and A. G. Davis Philip.* **278**, 208, 26-C6 (1984)
- Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. *J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray.* **278**, 224, 26-D8 (1984)
- Energy Balance of Stellar Coronae. III. Effect of Stellar Mass and Radius. *Reiner Hammer.* **280**, 780, 58-D3 (1984)
- Temperatures and Surface Gravities of DB White Dwarfs. *J. B. Oke,*

Stars: Atmospheres—Continued

- V. Weidemann, and D. Koester. **281**, 276, 64-A1 (1984)
 Self-similar Magnetohydrodynamics. III. The Subset of Spherically Symmetric Gasdynamic Flows. B. C. Low. **281**, 381, 65-B1 (1984)
 Effective Temperatures and Surface Gravities of Metallic-Line A Stars. M. C. Lane and John B. Lester. **281**, 723, 70-D7 (1984)
 Two-Dimensional Compressible Convection Extending over Multiple Scale Heights. Neal E. Hurlburt, Juri Toomre, and Joseph M. Masuger. **282**, 557, 81-B11 (1984)
 Combined Effect of Potential and Nonpotential Magnetic Fields on Equilibrium in Stellar Atmospheres. Ernst B. Gliner. **283**, 363, 90-A1 (1984)
 Analyses of the Visual Spectra of White Dwarfs Containing Carbon. G. Wegner and F. H. Yackovich. **284**, 257, 100-G6 (1984)
 The Many Faces of Capella: A Search for Rotational Modulations and a Study of Systematic Velocities of Emission Lines in the Ultraviolet. Thomas R. Ayres. **284**, 784, 107-E7 (1984)
 An Efficient Method for Computing Spectral Line Profiles in Stellar Envelopes. Claude Bertout. **285**, 269, 112-G6 (1984)
 Heating the Sun's Lower Transition Region with Fine-Scale Electric Currents. Douglas Rabin and Ronald Moore. **285**, 359, 113-G5 (1984)
 Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. V. Line Formation in a Static Atmosphere. C. Rogers. **286**, 659, 130-D1 (1984)
 Feige 24: Wind/Flare Accretion by a Hot Dazl Degenerate. E. M. Sion and S. G. Starrfield. **286**, 760, 131-D7 (1984)
 The Appearance of Magnetic Flux on the Surfaces of the Early Main-Sequence F Stars. Mark S. Giampapa and Robert Rosner. **286**, L19, 126-E7 (1984)
 Analytical Models of Neutron Star Envelopes. Lars Hernquist and James H. Applegate. **287**, 244, 135-E8 (1984)
 Similar Photospheres, Different Mantles: A Study of Four O Stars. Anne B. Underhill. **287**, 874, 143-G3 (1984)
 The Spectra of X-Ray Bursting Neutron Stars. Richard A. London, Ronald E. Taam, and W. Michael Howard. **287**, L27, 138-D14 (1984)
- Stars: Ba II**
 The Problem of the Barium Stars. Erika Böhm-Vitense, James Nemec, and Charles Proffitt. **278**, 726, 33-G6 (1984)
- Stars: Be**
 Optical Identification of 2S 1417 – 62. J. E. Grindlay, L. D. Petro, and J. E. McClintock. **276**, 621, 8-C11 (1984)
 Some Effects of Rotation on the Structure and Dynamics of a Radiation-driven Wind from a Hot Star. J. M. Marlborough and M. Zamir. **276**, 706, 9-C2 (1984)
 X-Ray Observations of X Persei. M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Narayan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland. **278**, 711, 33-F5 (1984)
 The Morphology of a Mass Loss Episode of the Be Star ω Orionis. Daniel P. Hayes and Edward F. Guinan. **279**, 721, 45-F8 (1984)
 Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock. **280**, 688, 57-C14 (1984)
 Be Stars in Binaries. Helmut A. Abt and Octavio Cardona. **285**, 190, 112-A10 (1984)
 Circumstellar Material around Rapidly Rotating B Stars. II. On the Nature of Ultraviolet Shell Lines in the Spectra of Be and Shell Stars. William R. Oegerle and Ronald S. Polidan. **285**, 648, 118-E9 (1984)
 The Abrupt Onset of a Major ω Orionis Mass Loss Episode. Edward F. Guinan and Daniel P. Hayes. **287**, L39, 138-E11 (1984)
- Stars: β Cephei**
 Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenlid. **281**, 766, 70-G8 (1984)
- Stars: Binaries**
 LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? D. Schönberner and J. S. Drilling. **276**, 229, 3-D1 (1984)
 The RS Canum Venaticorum Phenomena. I. H α Emission in HR 1099. Dorothy A. Fraquelli. **276**, 243, 3-E1 (1984)
 A Long-Period Orbit for the Binary Wolf-Rayet Star HD 193793, WC7 + O4–5. Robert Lamontagne, Anthony F. J. Moffat, and Wilhelm Seggewiss. **277**, 258, 13-F10 (1984)
 E2003 + 225: A 3^h42^m AM Herculis Type Binary System. J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal. **277**, 682, 19-E7 (1984)
 Protostellar Formation in Rotating Interstellar Clouds. IV. Nonisothermal Collapse. Alan Paul Boss. **277**, 768, 20-E2 (1984)
 Is There Life after Core Collapse in Globular Clusters? Haldan Cohn and Piet Hut. **277**, L45, 22-E10 (1984)
 A Search for Radial Velocity Variations in the Blue Stragglers of NGC 7789. L. L. Stryker and B. J. Hrivnak. **278**, 215, 26-C13 (1984)
 VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips. **278**, 220, 26-D4 (1984)
 Polarized Radiation from Hot Plasmas and Applications to AM Herculis Binaries. II. Effect of Collisions and Thomson Scattering. P. E. Barrett and G. Channugam. **278**, 298, 27-C2 (1984)
 Absolute Dimensions of Unevolved O Type Close Binaries. C. Doom and C. de Loore. **278**, 695, 33-E2 (1984)
 Radio Observations of W Ursae Majoris Stars. V. A. Hughes and B. J. McLean. **278**, 716, 33-F10 (1984)
 The Problem of the Barium Stars. Erika Böhm-Vitense, James Nemec, and Charles Proffitt. **278**, 726, 33-G6 (1984)
 Duplicity of the "Supermassive" Object R136a. Charles E. Worley. **278**, L109, 36-B12 (1984)
 Supernovae in Cataclysmic Variable Systems and the Formation of Low-Mass X-Ray Binaries. Ronald E. Taam and B. A. Fryxell. **279**, 166, 38-G2 (1984)
 Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips. **279**, 184, 39-A8 (1984)
 The Blue Stragglers of M67. Ruth C. Peterson, Bruce W. Carney, and David W. Latham. **279**, 237, 39-E13 (1984)
 The Nature of Symbiotic Stars. Scott J. Kenyon and Ronald F. Webbink. **279**, 252, 39-F14 (1984)
 Broad-Band Photometry of Extreme Helium Stars. J. S. Drilling, A. U. Landolt, and D. Schönberner. **279**, 748, 46-A7 (1984)
 IUE Spectrophotometry of the DA4 Primary in the Short-Period White Dwarf–Red Dwarf Spectroscopic Binary Case 1. E. M. Sion, F. Wesemael, and E. F. Guinan. **279**, 758, 46-B3 (1984)
 Constraints on the Progenitor Binary System for PSR 1913 + 16. J. M. Cordes and I. Wasserman. **279**, 798, 46-E2 (1984)
 The Close Binary Central Star of the Planetary Nebula Abell 41: A Helium-rich Subdwarf Primary. Richard F. Green, James Liebert, and F. Wesemael. **280**, 177, 51-A1 (1984)
 Optical and Infrared Photometry of Late-Type Stars in the Pleiades. John R. Stauffer. **280**, 189, 51-B3 (1984)
 A Spectroscopic Study and Mass Determination for the Cataclysmic Variable AC Cancri. Eric M. Schlegel, Ronald H. Kaitchuck, and R. Kent Honeycutt. **280**, 235, 51-E10 (1984)
 Homologous Evolution of Stellar Systems after Core Collapse. Jeremy Goodman. **280**, 298, 52-C4 (1984)
 The Detection of Variable, Nonthermal Radio Emission from Two O Type Stars. David C. Abbott, J. H. Bieging, and E. Churchwell. **280**, 671, 57-B10 (1984)
 Evolution of the Optical Spectrum of HM Sagittae: 1977–1982. John R. Stauffer. **280**, 695, 57-D7 (1984)
 Models of the Hard X-Ray Spectrum of AM Herculis and Implications for the Accretion Rate. J. H. Swank, A. C. Fabian, and R. R. Ross. **280**, 734, 57-G3 (1984)
 Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. Peter Bodenheimer and Ronald E. Taam. **280**, 771, 58-C7 (1984)
 The Binary Nature of the CH Stars. Robert D. McClure. **280**, L31, 54-E7 (1984)
 Rapid Intensity Variability in the Jets of SS 433. Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes. **281**, 313, 64-C13 (1984)
 X Cygni: Duplicity, Period Stability, and Atmospheric Velocity Structure. Nancy Remage Evans. **281**, 760, 70-G2 (1984)
 Detection of Binaries with Projected Separations as Large as 0.1 Parsec. David W. Latham, John Tonry, John N. Bahcall, Raymond M. Soneira, and Paul Schechter. **281**, L41, 66-G10 (1984)
 IR Geminorum: Indications of a Massive White Dwarf and a Heated Secondary in this New SU Ursae Majoris Cataclysmic Variable. Paula Szkody, Allen W. Shafter, and Anne P. Cowley. **282**, 236, 76-D12 (1984)
 The Appearance, Number, and History of Highly Compact Binary Systems in Globular Clusters. Julian H. Krolik. **282**, 452, 80-B4 (1984)
 The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. J. H. Krolik, A. Meiksin, and P. C. Joss. **282**, 466, 80-C4 (1984)
 Conservative Mass Transfer. II. The Effective Perturbing Force: Equations of Motion for the Eccentricity and Orbital Period. John J. Matese and Daniel P. Whitmire. **282**, 522, 80-G4 (1984)
 Einstein Observations of Selected Close Binaries and Shell Stars. Edward F. Guinan, Robert H. Koch, and Mirek J. Plavec. **282**, 667, 82-C11 (1984)
 Spectroscopic Studies of Wolf-Rayet Stars with Absorption Lines. VIII. HD 193793. Peter S. Conti, Diane Roussel-Dupré, Philip Massey, and Michael Rensing. **282**, 693, 82-E11 (1984)

- Ultraviolet Flare on Lambda Andromedae. *S. L. Baliunas, E. F. Guinan, and A. K. Dupree*. **282**, 733, 83-B1 (1984)
- Determination of the Mass of Globular Cluster X-Ray Sources. *J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman*. **282**, L13, 78-A13 (1984)
- Detection of a Sub-Milliarsecond Radio Component in the RS CVn System 1099. *Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston*. **282**, L23, 78-B12 (1984)
- IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979–1983. *R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung*. **283**, 226, 88-D13 (1984)
- The Lower Main Sequence and the Nature of Secondary Stars in Ultracompact Binaries. *S. Rappaport and P. C. Joss*. **283**, 232, 88-E5 (1984)
- Are Cataclysmic Variables the Progenitors of Type I Supernovae? *Jim MacDonald*. **283**, 241, 88-E14 (1984)
- Two-Frequency Radio Spectra during the Outburst of the Periodic Radio Star LSI +61°303. *A. R. Taylor and P. C. Gregory*. **283**, 273, 89-A6 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pralgo, N. E. White, K. S. Wood, and D. J. Yentis*. **283**, L53, 97-C2 (1984)
- On the Fission Theory of Binary Stars. IV. Exact Solutions in Polynomial Spaces. *N. R. Lebovitz*. **284**, 364, 102-A1 (1984)
- On the Nature of the Wolf-Rayet Component in the Core of the Massive Galactic H II Region NGC 3603. *Anthony F. J. Moffat and Virpi S. Niemela*. **284**, 631, 106-A4 (1984)
- Effects of Encounters with Field Stars on the Evolution of Low-Mass Semidetached Binaries. *Piet Hut and Bohdan Paczyński*. **284**, 675, 106-D6 (1984)
- The Evolution of Low-Mass Close Binaries Influenced by the Radiation of Gravitational Waves and by a Magnetic Stellar Wind. *Icko Iben, Jr. and Alexander V. Tutukov*. **284**, 719, 106-G8 (1984)
- Infrared Emission from Accretion Disks: Detectability and Variability. *J. H. Beall, F. K. Knight, H. A. Smith, K. S. Wood, M. Lebofsky, and G. Rieke*. **284**, 745, 107-B9 (1984)
- The Many Faces of Capella: A Search for Rotational Modulations and a Study of Systematic Velocities of Emission Lines in the Ultraviolet. *Thomas R. Ayres*. **284**, 784, 107-E7 (1984)
- Be Stars in Binaries. *Helmut A. Abt and Octavio Cardona*. **285**, 190, 112-A10 (1984)
- The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley*. **285**, 202, 112-B8 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 – 451 in the High and Low States. *L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips*. **285**, 214, 112-C6 (1984)
- Comparison of the X-Ray Observations of the AM Herculis Objects to Theory. *James N. Inamuro*. **285**, 223, 112-D2 (1984)
- The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. *G. Channugam and A. Ray*. **285**, 252, 112-F3 (1984)
- Radio Emission from Symbiotic Stars: A Binary Model. *A. R. Taylor and E. R. Seaquist*. **286**, 263, 124-F14 (1984)
- The Magnetic Field of the AM Herculis Object H0139-68. *D. T. Wickramasinghe, N. Visvanathan, and I. R. Tuohy*. **286**, 328, 125-D13 (1984)
- Long-Term Post-Newtonian Effects in a Binary System. *Miquel Portilla and Ramon Lapiedra*. **286**, 633, 130-B3 (1984)
- Time-resolved Spectroscopy of SS Cygni at Minimum and Maximum Light. *F. V. Hessman, E. L. Robinson, R. E. Nather, and E.-H. Zhang*. **286**, 747, 131-C8 (1984)
- Hot Subdwarfs in Detached Binary Systems and Thick-Disk Cataclysmic Variables from the Palomar-Green Survey. *Donald H. Ferguson, Richard F. Green, and James Liebert*. **287**, 320, 136-D10 (1984)
- X-Rays from Accretion of Red Giant Winds. *M. Jura and D. J. Helfand*. **287**, 785, 142-G8 (1984)
- The 41.5 Day Binary X-Ray Pulsar 4U 1223 – 62 (GX 301 – 2). *N. E. White and J. H. Swank*. **287**, 856, 143-E13 (1984)
- Spectrophotometry of the RS Canum Venaticorum Stars. II. A Study of Seven Systems from 4000–11000 Angstroms. *Steven N. Shore and Saul J. Adelman*. **54**, 151, 2-G8 (1984) (Abstr. in **275**, 929, 147-F2)
- Speckle Interferometric Measurements of Binary Stars. IX. *Harold A. McAlister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel*. **54**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)
- Supernovae of Type I as End Products of the Evolution of Binaries with Components of Moderate Initial Mass ($M \leq 9 M_{\odot}$). *Icko Iben, Jr. and Alexander V. Tutukov*. **54**, 335, 6-A1 (1984) (Abstr. in **276**, 800, 10-B12)
- Ultraviolet and Optical Studies of Binaries with Luminous Cool Primaries and Hot Companions. III. Reticon Radial Velocities: Erratum. *Sidney B. Parsons*. **54**, 372, 6-C10 (1984) (Orig. paper in **53**, 553, 24-E1)
- Ca II Emission Surface Fluxes in Active Chromosphere Stars. *Bernard W. Bopp*. **54**, 387, 7-A14 (1984) (Abstr. in **277**, 907, 22-A8)
- The Period Distribution of Unevolved Close Binary Systems. *G. Giuricin, F. Mardirossian, and M. Mezzetti*. **54**, 421, 7-E5 (1984) (Abstr. in **277**, 908, 22-A9)
- The Evolution of Cataclysmic and Low-Mass X-Ray Binaries. *Joseph Patterson*. **54**, 443, 8-A8 (1984) (Abstr. in **278**, 894, 35-E12)
- Hard Binary-Single Star Scattering Cross Sections for Equal Masses. *Piet Hut*. **55**, 301, 15-B1 (1984) (Abstr. in **280**, 940, 60-B4)
- The Vertical Structure and Stability of Alpha Model Accretion Disks. *J. K. Cannizzo and J. C. Wheeler*. **55**, 367, 16-A2 (1984) (Abstr. in **281**, 890, 72-C3)
- Accurate Integrations of the Roche Model. *Stefan W. Mochnacki*. **55**, 551, 19-A9 (1984) (Abstr. in **282**, 820, 84-A10)
- A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. *G. A. Doschek and R. D. Cowan*. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- Stars: Carbon**
- LMC Blue Globular Clusters Containing Cepheids. I. NGC 1856. *P. W. Hodge and S.-O. Lee*. **276**, 509, 7-B7 (1984)
- Discovery of the First Carbon Star in NGC 6822. *M. Aaronson, G. S. Da Costa, P. Hartigan, J. R. Mould, J. Norris, and H. S. Stockman*. **277**, L9, 16-A9 (1984)
- Silane in IRC +10216. *D. M. Goldhaber and A. L. Betz*. **279**, L55, 48-B12 (1984)
- The Intermediate Age SMC Globular Cluster Lindsay 113. *J. R. Mould, G. S. Da Costa, and M. D. Crawford*. **280**, 595, 56-C12 (1984)
- The $^{12}\text{C}/^{13}\text{C}$ Ratio of the Carbon Star V460 Cygni Revisited. *Irene R. Little-Marenin and Stephen J. Little*. **283**, 188, 88-B2 (1984)
- Line Identifications in the Ultraviolet (2590–3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. *Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton*. **283**, 760, 95-C2 (1984)
- The H γ Flux Peak and the Hydrogen Abundance in N Type Carbon Stars. *J. H. Goebel and H. R. Johnson*. **284**, L39, 109-B9 (1984)
- The Distribution of HCN in the Circumstellar Envelope of IRC +10216. *J. H. Bieging, B. Chapman, and W. J. Welch*. **285**, 656, 118-F3 (1984)
- Luminous Late-Type Stars in NGC 205. *Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett*. **287**, 138, 134-D9 (1984)
- The Chemical Composition and Evolutionary State of the Early R Stars. *James F. Dominy*. **55**, 27, 11-C1 (1984) (Abstr. in **279**, 909, 47-F14)
- Stars: Catalogs**
- The S201 Far-Ultraviolet Imaging Survey. III. A Field in Sagittarius. *George R. Carruthers and Thornton Page*. **55**, 101, 12-A3 (1984) (Abstr. in **279**, 911, 47-G2)
- A Library of Stellar Spectra. *George H. Jacoby, Deidre A. Hunter, and Carol A. Christian*. **56**, 257, 25-F6 (1984) (Abstr. in **284**, 870, 108-E2)
- Stars: Cepheids**
- The Distance to IC 1613 from Infrared Photometry of Cepheids. *Christopher W. McAlary, Barry F. Madore, and Lindsey E. Davis*. **276**, 487, 6-G10 (1984)
- LMC Blue Globular Clusters Containing Cepheids. I. NGC 1856. *P. W. Hodge and S.-O. Lee*. **276**, 509, 7-B7 (1984)
- Long-Period Classical Cepheids: Theory versus Observation. *T. Richard Carson and Richard B. Stothers*. **276**, 593, 8-A11 (1984)
- The Chromospheres of Classical Cepheids. II. High-Resolution Profiles of the Mg II h and k Lines. *Edward G. Schmidt and Sidney B. Parsons*. **279**, 202, 39-C1 (1984)
- The Chromospheres of Classical Cepheids. III. A Search for Transition Region Emission Lines. *Edward G. Schmidt and Sidney B. Parsons*. **279**, 215, 39-D2 (1984)
- X Cygni: Duplicity, Period Stability, and Atmospheric Velocity Structure. *Nancy Reme Evans*. **281**, 760, 70-G2 (1984)
- Very Slow Classical Cepheids: Theoretical Models with Periods Longer than 50 Days. *T. Richard Carson and Richard B. Stothers*. **281**, 811, 71-D1 (1984)
- The Distance to NGC 2403 Based on Near-Infrared Observations of Cepheids. *Christopher W. McAlary and Barry F. Madore*. **282**, 101, 75-A13 (1984)
- Stellar Acoustics. II. Pulse Resonance in Giant Star Models. *Toshiki Aikawa and Charles A. Whitney*. **282**, 527, 80-G9 (1984)
- A Survey of Cepheid Stars. *J. D. Fernie*. **282**, 641, 82-A11 (1984)
- Surface Brightness Radii, Distances, and Absolute Magnitudes of

Stars: Cepheids—Continued

- Classical Cepheids. Wolfgang Gieren. **282**, 650, 82-B8 (1984)
- Abundances of Distant Classical Cepheid Variables. Hugh C. Harris and Catherine A. Pilachowski. **282**, 655, 82-B13 (1984)
- An Investigation of the Stellar Association Containing the 1.95 Day Cepheid SU Cassiopeiae. David G. Turner and Nancy Remage Evans. **283**, 254, 88-F13 (1984)
- Is the Metal Contribution to the Astrophysical Opacity Incorrect? N. H. Magee, Jr., A. L. Merts, and W. F. Huebner. **283**, 264, 88-G10 (1984)
- Phase Lags and Pulsation Modes of Classical Cepheids. Norman R. Simon. **284**, 278, 101-A13 (1984)
- The Luminosity Scale of Cepheid Variable Stars: A Revision. Edward G. Schmidt. **285**, 501, 117-A4 (1984)
- Photographic Photometry of the Open Cluster NGC 7790. Mario Pedreras, Barry F. Madore, and Wendy L. Freedman. **286**, 563, 129-C13 (1984)
- Luminous Late-Type Stars in NGC 205. Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett. **287**, 138, 134-D9 (1984)
- Yellow Giants in Young Clusters. II. A Comparison of Observation with Theory. Edward G. Schmidt. **287**, 261, 135-F11 (1984)
- JHK Observations of Classical Cepheids. D. L. Welch, F. Wieland, C. W. McAlary, R. McGonagall, B. F. Madore, R. A. McLaren, and G. Neugebauer. **54**, 547, 9-D4 (1984) (Abstr. in **278**, 895, 35-E13)
- Observational Studies of Cepheids. II. BVRI Photometry of 112 Cepheids. Thomas J. Moffett and Thomas G. Barnes III. **55**, 389, 16-B10 (1984) (Abstr. in **281**, 890, 72-C3)

Stars: Chromospheres

- An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan. **276**, 254, 3-E12 (1984)
- Lithium Abundances and Chromospheric Activity. I. Empirical Results. Mark S. Giampapa. **277**, 235, 13-D13 (1984)
- Rotational Modulation of the Chromospheric Activity in χ^1 Orionis (G0 V). Ann Merchant Boesgaard and Theodore Simon. **277**, 241, 13-E5 (1984)
- The Time Dependence of Chromospheric Decay for Solar Type Stars. Don C. Barry, Keith Hege, and Richard H. Cromwell. **277**, L65, 22-G2 (1984)
- Sigma Geminorum (K1 III + ?): Variability of the Ultraviolet Lines near Conjunction. Thomas R. Ayres, Theodore Simon, and Jeffrey L. Linsky. **279**, 197, 39-B8 (1984)
- The Chromospheres of Classical Cepheids. II. High-Resolution Profiles of the Mg II h and k Lines. Edward G. Schmidt and Sidney B. Parsons. **279**, 202, 39-C1 (1984)
- The Chromospheres of Classical Cepheids. III. A Search for Transition Region Emission Lines. Edward G. Schmidt and Sidney B. Parsons. **279**, 215, 39-D2 (1984)
- The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana. **281**, 815, 71-D5 (1984)
- Chromospheres and Mass Loss in Metal-deficient Giant Stars. A. K. Dupree, L. Hartmann, and E. H. Avrett. **281**, L37, 66-G7 (1984)
- Chromospheric Lines in Red Dwarf Flare Stars. II. EV Lacertae, EQ Pegasi A, and V1054 Ophiuchi. Bjørn R. Pettersen, David S. Evans, and Lawrence A. Coleman. **282**, 214, 76-C4 (1984)
- Detection of a Sub-Milliarsecond Radio Component in the RS CVn System 1099. Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston. **282**, L23, 78-B12 (1984)
- Color Anomalies and Starspots in Hyades Dwarfs. Bruce Campbell. **283**, 209, 88-C9 (1984)
- Carotating Interaction Regions in Stellar Winds. D. J. Mullan. **283**, 303, 89-C11 (1984)
- High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres. **283**, 731, 95-A1 (1984)
- Age-Rotation Relationship for Late-Type Main-Sequence Stars. T. N. Rengarajan. **283**, L63, 97-C14 (1984)
- On the Extended Chromosphere of α Orionis. L. Hartmann and E. H. Avrett. **284**, 238, 100-F1 (1984)
- The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. S. A. Drake, A. Brown, and J. L. Linsky. **284**, 774, 107-D10 (1984)
- The Many Faces of Capella: A Search for Rotational Modulations and a Study of Systematic Velocities of Emission Lines in the Ultraviolet. Thomas R. Ayres. **284**, 784, 107-E7 (1984)

Characteristics of the Fe II and C II Emission in High-Resolution IUE Spectra (2300–3000 Å) of Alpha Orionis. Kenneth G. Carpenter. **285**, 181, 112-A1 (1984)

- The FK Comae Candidate UZ Librae. Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley. **285**, 202, 112-B8 (1984)
- Consequences of a Chromospheric Temperature Gradient on the Width of H α in Late-Type Giants. D. M. Zarro. **285**, 232, 112-D11 (1984)
- Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)
- The Temperature of C II Emission-Line Formation Regions in Cool Stars. Alexander Brown and Kenneth G. Carpenter. **287**, L43, 138-F1 (1984)
- Ca II Emission Surface Fluxes in Active Chromosphere Stars. Bernard W. Bopp. **54**, 387, 7-A14 (1984) (Abstr. in **277**, 907, 22-A8)
- Stars: Circumstellar Shells
- Comments on the Ultraviolet Spectrum of γ^2 Velorum. Jorge Sahade, Yoji Kondo, and George E. McCluskey, Jr. **276**, 281, 3-G11 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson. **276**, 572, 7-G4 (1984)
- The Three-dimensional Structure of a Circumstellar Maser. P. F. Bowers and Mark Morris. **276**, 646, 8-E9 (1984)
- Some Effects of Rotation on the Structure and Dynamics of a Radiation-driven Wind from a Hot Star. J. M. Marlborough and M. Zamir. **276**, 706, 9-C2 (1984)
- Diffraction-limited Spatial Resolution of Circumstellar Dust Shells at 10 Microns. E. E. Bloemhof, C. H. Townes, and A. H. B. Vanderwyck. **276**, L21, 5-F10 (1984)
- The Spectrum of V348 Sagittarii. Oved Dahari and Donald E. Osterbrock. **277**, 648, 14-B7 (1984)
- The Infrared Dust Shell around the WC9 Star Ve 2-45. H. M. Dyck, Theodore Simon, and R. D. Wolstencroft. **277**, 675, 19-D14 (1984)
- Far-Infrared and Submillimeter Observations of the Low-Luminosity Protostars L1455 FIR and L1551 IRS 5: The Confinement of Bipolar Outflows. J. A. Davidson and D. T. Jaffe. **277**, L13, 16-A13 (1984)
- The Infrared Signature of Graphite Grains. B. T. Draine. **277**, L71, 22-G8 (1984)
- Observations and Analysis of Circumstellar Cyanoacetylene. P. R. Jewell and L. E. Snyder. **278**, 176, 26-A1 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- IRAS Observations of Two Early-Type Pre-Main-Sequence Stars in the Association Chamaeleon I. P. R. Wesselius, D. A. Beintema, and F. M. Olmon. **278**, L37, 29-E10 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- The Radio Structure of HM Sagittae. Sun Kwok, R. C. Bignell, and C. R. Purton. **279**, 188, 39-A12 (1984)
- CN and C₂H in IRC + 10216. P. J. Huggins, A. E. Glassgold, and Mark Morris. **279**, 284, 40-B5 (1984)
- VLA Observations of 1612 and 1667 MHz OH Masers Associated with IRC + 10420. P. F. Bowers. **279**, 350, 40-G3 (1984)
- Silane in IRC + 10216. D. M. Goldhaber and A. L. Betz. **279**, L55, 48-B12 (1984)
- The Dust around R Coronae Borealis Type Stars. J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu. **280**, 228, 51-E3 (1984)
- Do Bipolar Magnetic Regions Exist on the Surfaces of Early-Type Stars? Anne B. Underhill and Richard P. Fahey. **280**, 712, 57-E11 (1984)
- The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr. **281**, 303, 64-C1 (1984)
- Multiple Circumstellar Shells and Radiation Pressure on Grains in the Outflow from Late-Type Stars. M. Jara. **282**, 200, 76-B4 (1984)
- Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. Jorge Cantó, Luis F. Rodríguez, Nuria Calvet, and Russell M. Leveault. **282**, 631, 82-A1 (1984)
- Einstein Observations of Selected Close Binaries and Shell Stars. Edward F. Guinan, Robert H. Koch, and Mirek J. Plavec. **282**, 667, 82-C11 (1984)
- SiO Flux Measurements of Variable Stars. F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson. **283**, 174, 88-A2 (1984)
- Velocity-resolved Infrared Spectroscopy of LkH α 101. M. Simon and L. Cassar. **283**, 179, 88-A7 (1984)
- Evidence for a High-Temperature Accretion Region in Algol-Type

- Binary Systems. *Geraldine J. Peters and Ronald S. Polidan*. **283**, 745, 95-B1 (1984)
- Identification of the SiCC Radical toward IRC +10216: The First Molecular Ring in an Astronomical Source. *P. Thaddeus, S. E. Cummins, and R. A. Linke*. **283**, L45, 97-B8 (1984)
- High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. *Gary L. Grasdale, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castellet*. **283**, L57, 97-C6 (1984)
- SiS in Circumstellar Shells. *R. Sahai, Ahwyn Wootten, and R. E. S. Clegg*. **284**, 144, 99-F2 (1984)
- Half-Range Moment Methods for Radiative Transfer in Spherical Geometry. III. Numerical Solution and Applications. *C. Rogers and P. G. Martin*. **284**, 327, 101-E6 (1984)
- Theory of Astrophysical SiO Masers. *S. H. Langer and W. D. Watson*. **284**, 751, 107-C1 (1984)
- The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. *S. A. Drake, A. Brown, and J. L. Linsky*. **284**, 774, 107-D10 (1984)
- Infrared Pumping for HC_3N in the Circumstellar Envelope of IRC +10216. *Shuji Deguchi and Masakatsu Uyemura*. **285**, 153, 111-E12 (1984)
- Linear Polarization of Astronomical Masers and Magnetic Fields. *L. R. Western and W. D. Watson*. **285**, 158, 111-F3 (1984)
- CO Line Emission from the Expanding Circumstellar Envelopes of Red Giants. *William K. Rose*. **285**, 237, 112-E2 (1984)
- Luminosities and Mass-Loss Rates of OH/ H_2O Maser Stars. *P. F. Bowers and Wendy Hagen*. **285**, 637, 118-E12 (1984)
- Circumstellar Material around Rapidly Rotating B Stars. II. On the Nature of Ultraviolet Shell Lines in the Spectra of Be and Shell Stars. *William R. Oegerle and Ronald S. Polidan*. **285**, 648, 118-E9 (1984)
- The Distribution of HCN in the Circumstellar Envelope of IRC +10216. *J. H. Bieging, B. Chapman, and W. J. Welch*. **285**, 656, 118-F3 (1984)
- On the Nature of the Material Surrounding Vega. *D. A. Harper, R. F. Loewenstein, and J. A. Davidson*. **285**, 808, 120-C8 (1984)
- The Circumstellar Interaction Model for the Radio Emission from a Type I Supernova. *Roger A. Chevalier*. **285**, L63, 121-E6 (1984)
- Narrow-Band Imaging and Velocity Maps of Young Stellar Objects: Initial Results. *J. S. Morgan, S. C. Wolff, S. E. Strom, and K. M. Strom*. **285**, L71, 121-E14 (1984)
- Thermal and Maser Molecular Lines from the Envelope of IRC +10216. *Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner*. **286**, 276, 125-A1 (1984)
- Discovery of Solar System-Size Halos around Young Stars. *S. Beckwith, B. Zuckerman, M. F. Skrutskie, and H. M. Dyck*. **287**, 793, 143-A2 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). *J. S. Miller, F. O. Clark, and T. H. Troland*. **287**, 892, 144-A7 (1984)
- OH Maser Emission from Warm Variable Stars. *John D. Fix and Mark J. Claussen*. **287**, L35, 138-E8 (1984)
- Stars: Collapsed**
- Effect of Initial Thermal Structure on the Collapse and Explosion of Iron Stellar Cores. *I. Lichtenstadt and S. A. Bludman*. **276**, 746, 9-E14 (1984)
- On Detecting Stellar Collapse with Neutrinos. *Adam Burrows*. **283**, 848, 96-B11 (1984)
- Collapse of Anisotropic Spheres in General Relativity: An Analytical Model. *J. M^a. Ibañez*. **284**, 381, 102-B4 (1984)
- On the Accuracy of the Single-Nucleus Approximation in the Equation of State of Hot, Dense Matter. *Adam Burrows and James M. Lattimer*. **285**, 294, 113-B6 (1984)
- The Collapse of Rotating Stellar Cores: Equilibria between White Dwarf and Neutron Star Densities. *Joel E. Tohline*. **285**, 721, 119-D2 (1984)
- Magnetorotational Iron Core Collapse. *Eugene M. D. Symbalisty*. **285**, 729, 119-D10 (1984)
- Electron Capture Supernovae: One-Zone Collapse Calculation for Stars with Masses $10 M_{\odot}$ and $15 M_{\odot}$. *A. Ray, S. M. Chitre, and K. Kar*. **285**, 766, 119-G6 (1984)
- Gravitational Radiation from Colliding Compact Stars: Hydrodynamical Calculations in Two Dimensions. *David L. Gilden and Stuart L. Shapiro*. **287**, 728, 142-C5 (1984)
- Stars: Combination Spectra**
- The Nature of Symbiotic Stars. *Scott J. Kenyon and Ronald F. Webbink*. **279**, 252, 39-F14 (1984)
- Evolution of the Optical Spectrum of HM Sagittae: 1977-1982. *John R. Stauffer*. **280**, 695, 57-D7 (1984)
- Changes in the Ultraviolet Spectrum of EG Andromedae. *Robert E. Stencel*. **281**, L75, 73-B10 (1984)
- IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. *R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung*. **283**, 226, 88-D13 (1984)
- A Radio Survey of Symbiotic Stars. *E. R. Seaquist, A. R. Taylor, and S. Button*. **284**, 202, 100-C7 (1984)
- Radio Emission from Symbiotic Stars: A Binary Model. *A. R. Taylor and E. R. Seaquist*. **286**, 263, 124-F14 (1984)
- Stars: Coronae**
- Contact Binary Stars. I. An X-Ray Survey. *R. G. Cruddace and A. K. Dupree*. **277**, 263, 13-G1 (1984)
- Magnetic Field Instabilities in Accretion Disks. *L. Stella and R. Rosner*. **277**, 312, 14-C11 (1984)
- Einstein Observations of X-Ray Emission from A Stars: Erratum. *L. Golub, F. R. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr.* **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- On the Dispersion in Brightness of Far-Ultraviolet Emission Lines of Cool Giant Stars. *Theodore Simon*. **279**, 738, 45-G11 (1984)
- Energy Balance of Stellar Coronae. III. Effect of Stellar Mass and Radius. *Reiner Hammer*. **280**, 780, 58-D3 (1984)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. *F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana*. **281**, 815, 71-D5 (1984)
- Recombination Stellar Wind Model for the Coronae of Early-Type Stars. *Wayne L. Waldron*. **282**, 256, 75-F4 (1984)
- On the Possibility of Resonant Electrodynamical Coupling in the Coronae of Red Dwarfs. *D. J. Mullan*. **282**, 603, 81-F1 (1984)
- High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. *A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres*. **283**, 731, 95-A1 (1984)
- Stars: δ Scuti**
- The Remarkable Multiple Mode δ Scuti Star BDS 1269A. *Bernard J. McNamara and Stephen J. Horan*. **282**, 741, 83-B9 (1984)
- Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. *Arthur N. Cox, Bernard J. McNamara, and William Ryan*. **284**, 250, 100-F13 (1984)
- Stars: Diameters**
- A Survey of Cepheid Stars. *J. D. Fernie*. **282**, 641, 82-A11 (1984)
- Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. *H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith*. **287**, 801, 143-A10 (1984)
- Stars: Dwarf Novae**
- Radial Velocity Studies of Cataclysmic Binaries. II. The Ultrashort Period Dwarf Nova T Leonis. *Allen W. Shafter and Paula Szkody*. **276**, 305, 4-B7 (1984)
- Observations of Quasi-periodic Oscillations in the Light Curve of VW Hydri. *Edward L. Robinson and Brian Warner*. **277**, 250, 13-E14 (1984)
- Ultraviolet Spectroscopy of the Dwarf Nova U Geminorum. *R. J. Paneke and A. V. Holm*. **277**, 700, 19-F11 (1984)
- Boundary Layers in Cataclysmic Variables: The HEAO 1 X-Ray Constraints. *Kenneth A. Jensen*. **278**, 278, 27-A10 (1984)
- Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. *F. A. Cordova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire*. **278**, 739, 34-A9 (1984)
- A Spectroscopic Study and Mass Determination for the Cataclysmic Variable AC Cancri. *Eric M. Schlegel, Ronald H. Kaitchuck, and R. Kent Honeycutt*. **280**, 235, 51-E10 (1984)
- An Unprecedented UV/Optical Flare in TV Columbae. *Paula Szkody and Mario Mateo*. **280**, 729, 57-F13 (1984)
- IR Geminorum: Indications of a Massive White Dwarf and a Heated Secondary in this New SU Ursae Majoris Cataclysmic Variable. *Paula Szkody, Allen W. Shafter, and Anne P. Cowley*. **282**, 236, 76-D12 (1984)
- The Appearance, Number, and History of Highly Compact Binary Systems in Globular Clusters. *Julian H. Krolik*. **282**, 452, 80-B4 (1984)
- The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. *J. H. Krolik, A. Meiksin, and P. C. Joss*. **282**, 466, 80-C4 (1984)
- WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? *M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne*. **282**, 763, 83-D4 (1984)
- Are Cataclysmic Variables the Progenitors of Type I Supernovae? *Jim MacDonald*. **283**, 241, 88-E14 (1984)
- The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. *G. Channugam and A. Ray*. **285**, 252, 112-F3 (1984)
- Time-resolved Spectroscopy of SS Cygni at Minimum and Maximum

Stars: Dwarf Novae—Continued

Light. F. V. Hessman, E. L. Robinson, R. E. Nather, and E.-H. Zhang. **286**, 747, 131-C8 (1984)

Hot Subdwarfs in Detached Binary Systems and Thick-Disk Cataclysmic Variables from the Palomar-Green Survey. Donald H. Ferguson, Richard F. Green, and James Liebert. **287**, 320, 136-D10 (1984)

The Evolution of the Optical Spectrum of the Dwarf Nova SS Cygni over One Complete Outburst Cycle. John T. Clarke, Debbie Capel, and Stuart Bowyer. **287**, 845, 143-D14 (1984)

The Evolution of Cataclysmic and Low-Mass X-Ray Binaries. Joseph Patterson. **54**, 443, 8-A8 (1984) (Abstr. in **278**, 894, 35-E12)

The Vertical Structure and Stability of Alpha Model Accretion Disks. J. K. Cannizzo and J. C. Wheeler. **55**, 367, 16-A2 (1984) (Abstr. in **281**, 890, 72-C3)

Stars: Early-Type

Radio Emission from the Outer Parts of Stellar Atmospheres (Mantles) at Centimeter Wavelengths and the Winds of Early-Type Stars. Anne B. Underhill. **276**, 583, 8-A1 (1984)

Some Effects of Rotation on the Structure and Dynamics of a Radiation-driven Wind from a Hot Star. J. M. Marlborough and M. Zamir. **276**, 706, 9-C2 (1984)

Absolute Dimensions of Unevolved O Type Close Binaries. C. Doom and C. de Loore. **278**, 695, 33-E2 (1984)

Effective Temperatures and Luminosities of Very Hot O Type Subdwarfs. D. Schönberner and J. S. Drilling. **278**, 702, 33-E9 (1984)

IRAS Observations of Two Early-Type Pre-Main-Sequence Stars in the Association Chamelaen I. P. R. Wesselius, D. A. Beintema, and F. M. Olnon. **278**, L37, 29-E10 (1984)

2 to 20 Micron Observations of Mass Loss from Early-Type Stars. David C. Abbott, C. M. Telesco, and Sidney C. Wolff. **279**, 225, 39-D14 (1984)

The Variation of Galactic Interstellar Extinction in the Ultraviolet. A. N. Witt, R. C. Bohlin, and T. P. Stecher. **279**, 698, 45-D11 (1984)

Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keichi Kodaira, and Keizo Nishi. **280**, 213, 51-D1 (1984)

The Detection of Variable, Nonthermal Radio Emission from Two O Type Stars. David C. Abbott, J. H. Bieging, and E. Churchwell. **280**, 671, 57-B10 (1984)

Do Bipolar Magnetic Regions Exist on the Surfaces of Early-Type Stars? Anne B. Underhill and Richard P. Fahey. **280**, 712, 57-E11 (1984)

Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si IV Star Wind Effect. Nolan R. Walborn and Robert J. Panek. **280**, L27, 54-E3 (1984)

Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. R. Brent Tully and S. C. Wolff. **281**, 67, 61-F3 (1984)

AB Stars in the Southern Galactic Halo. III. Kinematics of the Halo. Jeffrey R. Pier. **281**, 260, 63-F8 (1984)

Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. Sumner Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell. **281**, 800, 71-C4 (1984)

Recombination Stellar Wind Model for the Coronae of Early-Type Stars. Wayne L. Waldron. **282**, 256, 75-F4 (1984)

Observations of the Stellar Radiation Field at 975 Å. Chet B. Opal and Charles S. Weller. **282**, 445, 80-A10 (1984)

Winds from Rotating, Magnetic, Hot Stars. I. General Model Results. David B. Friend and Keith B. MacGregor. **282**, 591, 81-E3 (1984)

The Central Star of the Planetary Nebula Abell 78. James B. Kaler and Walter A. Feibelman. **282**, 719, 83-A1 (1984)

On the Correlation of CO Line and Radio Continuum Emission in Nearby Galaxies and the Efficiency of OB Star Formation. F. P. Israel and M. Rowan-Robinson. **283**, 81, 87-A2 (1984)

Line Profile Variation in δ Orionis A, ϵ Orionis A, and 15 Monocerotis. C. A. Grady, T. P. Snow, and W. C. Cash. **283**, 218, 88-D4 (1984)

Properties of R136a as Derived from Its Optical Light Distribution. You-Hua Chu, Joseph P. Cassinelli, and Mark G. Wolfire. **283**, 560, 93-A4 (1984)

Far-Ultraviolet Spectrophotometry of Two Very Hot O Type Subdwarfs. J. S. Drilling, J. B. Holberg, and D. Schönberner. **283**, L67, 97-D3 (1984)

Mass Loss in O-Type Stars: Parameters Which Affect It. C. D. Garmany and P. S. Conti. **284**, 705, 106-F8 (1984)

The Ultraviolet Variability of Early-Type Supergiants. Anne B. Underhill. **285**, 668, 118-G1 (1984)

Ultraviolet Spectral Morphology of the O Stars. II. The Main Sequence. Nolan R. Walborn and Robert J. Panek. **286**, 718, 131-A4 (1984)

Rotational Velocities of Later B Type and A Type Stars as Determined from Ultraviolet versus Visual Line Profiles. Kenneth G. Carpenter, Arne Slettebak, and George Sonneborn. **286**, 741, 131-C2 (1984)

Main-Sequence B Stars with Strong Winds in the Core of NGC 6231. Derck Massa, Blair D. Savage, and Joseph P. Cassinelli. **287**, 814, 143-B9 (1984)

The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. Erika Böhm-Vitense, Paul Hodge, and Don Boggs. **287**, 825, 143-C7 (1984)

Similar Photospheres, Different Mantles: A Study of Four O Stars. Anne B. Underhill. **287**, 874, 143-G3 (1984)

The S201 Far-Ultraviolet Imaging Survey. II. A Field in Cygnus. George R. Carruthers and Thornton Page. **54**, 271, 5-C2 (1984) (Abstr. in **276**, 799, 10-B11)

The S201 Far-Ultraviolet Imaging Survey. III. A Field in Sagittarius. George R. Carruthers and Thornton Page. **55**, 101, 12-A3 (1984) (Abstr. in **279**, 911, 47-G2)

Stars: Eclipsing Binaries

PG 1012 – 029: A High-Excitation Eclipsing Cataclysmic Variable. William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green. **276**, 233, 3-D5 (1984)

The Orientation of the Orbit Plane of Algol AB. Robert S. Harrington. **277**, L69, 22-G6 (1984)

Absolute Dimensions and Masses of Eclipsing Binaries. IV. EE Pegasi Is a Triple Star. Claud H. Lacy and Daniel M. Popper. **281**, 268, 63-G2 (1984)

The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)

Ultraviolet Photometry from the Orbiting Astronomical Observatory. XXXIX. The Structure of the Eclipsing Wolf-Rayet Binary V444 Cygni as Derived from Light Curves between 2460 Å and 3.5 Microns. A. M. Cherepashchuk, Joel A. Eaton, and Kh. F. Khaliullin. **281**, 774, 71-A4 (1984)

Changes in the Ultraviolet Spectrum of EG Andromedae. Robert E. Stencel. **281**, L75, 73-B10 (1984)

Einstein Observations of Selected Close Binaries and Shell Stars. Edward F. Guinan, Robert H. Koch, and Mirek J. Plavec. **282**, 667, 82-C11 (1984)

Observations, Analysis, and Absolute Parameters of the Evolved Binary AI Phoenicis. B. J. Hrivnak and E. F. Milone. **282**, 748, 83-C3 (1984)

WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne. **282**, 763, 83-D4 (1984)

Evidence for a High-Temperature Accretion Region in Algol-Type Binary Systems. Geraldine J. Peters and Ronald S. Polidan. **283**, 745, 95-B1 (1984)

Discovery of a 7.1 Hour Period and Eclipses from MXB 1659 – 29. L. R. Cominsky and K. S. Wood. **283**, 765, 95-C8 (1984)

Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga. **284**, 799, 107-F8 (1984)

S Cancri: A Semidetached System with a Very Low Mass Secondary. Daniel M. Popper and Jocelyn Tomkin. **285**, 208, 112-B14 (1984)

A Radial Velocity Study of XY Leonis. B. J. Hrivnak, E. F. Milone, G. Hill, and W. A. Fisher. **285**, 683, 119-A4 (1984)

Helium Content of the Population II Binary System CM Draconis. Bohdan Paczyński and Ryszard Sienkiewicz. **286**, 332, 125-E3 (1984)

The Epsilon Aurigae Secondary: A Binary Embedded within a Disk? Jack J. Lissauer and Dana E. Backman. **286**, L39, 132-D10 (1984)

The Orbital Motion of DI Herculis as a Test of a Theory of Gravitation. J. W. Moffat. **287**, L77, 145-E1 (1984)

A Light Synthesis Program for Binary Stars. I. Albert P. Linnell. **54**, 17, 1-B3 (1984) (Abstr. in **275**, 926, 147-E13)

Spectrophotometry of the RS Canum Venaticorum Stars. II. A Study of Seven Systems from 4000–11000 Angstroms. Steven N. Shore and Saul J. Adelman. **54**, 151, 2-G8 (1984) (Abstr. in **275**, 929, 147-F2)

A Study of the O'Connell Effect in the Light Curves of Eclipsing Binaries. T. J. Davidge and E. F. Milone. **55**, 571, 19-C1 (1984) (Abstr. in **282**, 820, 84-A10)

Observations of the O'Connell Effect System VY Crucis. E. F. Milone and B. J. Hrivnak. **56**, 295, 27-A2 (1984) (Abstr. in **285**, 874, 121-A5)

Stars: Emission-Line

The RS Canum Venaticorum Phenomena. I. H α Emission in HR 1099. Dorothy A. Fraquelli. **276**, 243, 3-E1 (1984)

The Response of Chromospheric Emission Lines to Flares on YZ Canis Minoris. Simon P. Worden, Timothy J. Schneberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram. **276**, 270, 3-F14 (1984)

The Chromospheric Hypothesis for the T Tauri Phenomenon. Nuria Calvet, Gibor Basri, and Leonard V. Kuhl. **277**, 725, 20-A11 (1984)

A Study of the Dependence of Mg II Emission on the Rotational

- Periods of Main-Sequence Stars. *L. Hartmann, S. L. Baliunas, D. K. Duncan, and R. W. Noyes.* **279**, 778, 46-C10 (1984)
- Mass Loss in T Tauri Stars: Observational Studies of the Cool Parts of Their Stellar Winds and Expanding Shells. *Reinhard Mundt.* **280**, 749, 58-A9 (1984)
- Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. *R. Brent Tully and S. C. Wolff.* **281**, 67, 61-F3 (1984)
- Rapid Intersity Variability in the Jets of SS 433. *Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes.* **281**, 313, 64-C13 (1984)
- Winds from Rotating, Magnetic, Hot Stars. I. General Model Results. *David B. Friend and Keith B. MacGregor.* **282**, 591, 81-E3 (1984)
- Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. *Jorge Cantó, Luis F. Rodríguez, Nuria Calvet, and Russell M. Leveault.* **282**, 631, 82-A1 (1984)
- Rapid Rotation and H α Emission Anomalies among Some Members of the Population of Low-Mass Stars. *Arthur Young, Andrew Skumanich, and Eugene Harlan.* **282**, 683, 82-D13 (1984)
- Velocity-resolved Infrared Spectroscopy of LkH α 101. *M. Simon and L. Cassar.* **283**, 179, 88-A7 (1984)
- A Spectroscopic Study of the Peculiar Giant FK Comae. I. The Radial Velocity Variation and Its Implications. *James K. McCarthy and Lawrence W. Ramsey.* **283**, 200, 88-B14 (1984)
- Asymmetries in Stellar Mg II h and k and Ca II H and K Line Profiles: Discrepancies Between Mg and Ca Asymmetries. *D. J. Mullan.* **284**, 769, 107-D5 (1984)
- The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley.* **285**, 202, 112-B8 (1984)
- Consequences of a Chromospheric Temperature Gradient on the Width of H α in Late-Type Giants. *D. M. Zarro.* **285**, 232, 112-D11 (1984)
- Narrow-Band Imaging and Velocity Maps of Young Stellar Objects: Initial Results. *J. S. Morgan, S. C. Wolff, S. E. Strom, and K. M. Strom.* **285**, L71, 121-E14 (1984)
- Spectrophotometry of Compact Embedded Infrared Sources in the 0.6-1.0 Micron Wavelength Region. *P. J. McGregor, S. E. Persson, and J. G. Cohen.* **286**, 609, 129-G4 (1984)
- Jets from Young Stars: The Case of R Monocerotis. *Edward R. Brugel, Reinhard Mundt, and Thomas Bührke.* **287**, L73, 145-D10 (1984)
- Stars: Evolution**
- An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. *L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan.* **276**, 254, 3-E12 (1984)
- Long-Period Classical Cepheids: Theory versus Observation. *T. Richard Carson and Richard B. Stothers.* **276**, 593, 8-A11 (1984)
- Effect of Initial Thermal Structure on the Collapse and Explosion of Iron Stellar Cores. I. *Lichtenstadt and S. A. Bludman.* **276**, 746, 9-E14 (1984)
- On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. *Roberto Buonoanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaino, and William Liller.* **277**, 220, 13-C12 (1984)
- Deep CCD Photometry in Globular Clusters. I. The Main Sequence of M4. *Harvey B. Richer and G. G. Fahlman.* **277**, 227, 13-D5 (1984)
- On the Frequency of Planetary Nebula Nuclei Powered by Helium Burning and on the Frequency of White Dwarfs with Hydrogen-deficient Atmospheres. *Icko Iben, Jr.* **277**, 333, 14-E4 (1984)
- The Anticorrelation of Cyanogen and CH on the Giant Branch of 47 Tucanae. *John Norris, K. C. Freeman, and G. S. Da Costa.* **277**, 615, 18-F10 (1984)
- The Spectrum of V348 Sagittarii. *Oved Dahari and Donald E. Osterbrock.* **277**, 648, 14-B7 (1984)
- On the Composition of the Stellar Winds of the Most Massive Stars: 100 M_{\odot} to 2200 M_{\odot} . *D. S. P. Dearborn and J. B. Blake.* **277**, 783, 20-F3 (1984)
- Evolution of 8-10 M_{\odot} Stars toward Electron Capture Supernovae. I. Formation of Electron-Degenerate O + Ne + Mg Cores. *Ken'ichi Nomoto.* **277**, 791, 20-F11 (1984)
- Ages of Intermediate-Age Magellanic Cloud Star Clusters. *Phillip J. Flower.* **278**, 582, 32-C7 (1984)
- Theoretical Zero-Age Main Sequences Applied to the Pleiades, Praesepe, and Hyades Star Clusters. *Don A. Vandenberg and Terry J. Bridges.* **278**, 679, 33-C14 (1984)
- Observational Evolution of the Central Stars of Planetary Nebulae. *Julius H. Cahn.* **279**, 304, 40-C13 (1984)
- Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. *Monique Tassoul and Jean-Louis Tassoul.* **279**, 384, 41-B9 (1984)
- The Population Structure of the Wing of the Small Magellanic Cloud. *Eduardo Hardy and Daniel Durand.* **279**, 567, 44-A13 (1984)
- HD 46703: A High-Luminosity Population II F-Type Star. *R. Earle Luck and Howard E. Bond.* **279**, 729, 45-G2 (1984)
- Optical and Infrared Photometry of Late-Type Stars in the Pleiades. *John R. Stauffer.* **280**, 189, 51-B3 (1984)
- Rotational Velocities of Low-Mass Stars in the Pleiades. *John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham.* **280**, 202, 51-C4 (1984)
- The Intermediate Age SMC Globular Cluster Lindsay 113. *J. R. Mould, G. S. Da Costa, and M. D. Crawford.* **280**, 595, 56-C12 (1984)
- Evolution of the Optical Spectrum of HM Sagittae: 1977-1982. *John R. Stauffer.* **280**, 695, 57-D7 (1984)
- Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. *Peter Bodenheimer and Ronald E. Taam.* **280**, 771, 58-C7 (1984)
- The Clusters of M33. *J. G. Cohen, S. E. Persson, and L. Searle.* **281**, 141, 62-D10 (1984)
- Color-Magnitude Photometry for the Globular Cluster NGC 288. *Edward W. Olszewski, R. Canterna, and William E. Harris.* **281**, 158, 62-E13 (1984)
- Absolute Dimensions and Masses of Eclipsing Binaries. IV. EE Pegasi Is a Triple Star. *Claud H. Lacy and Daniel M. Popper.* **281**, 268, 63-G2 (1984)
- The Main-Sequence Turnoff of the Metal-rich Globular Cluster NGC 6171. *G. S. Da Costa, J. R. Mould, and S. Ortolani.* **282**, 125, 75-C9 (1984)
- The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. *J. H. Krolik, A. Meiksin, and P. C. Joss.* **282**, 466, 80-C4 (1984)
- A Paradoxical Gap in the Relative Ages of T Tauri Stars. *Wm. Bruce Weaver.* **282**, 688, 82-E6 (1984)
- Observations, Analysis, and Absolute Parameters of the Evolved Binary AI Phoenicis. *B. J. Hrivnak and E. F. Milone.* **282**, 748, 83-C3 (1984)
- The Detectability of Population III "Jupiters". *H. Karimabadi and L. Blitz.* **283**, 169, 87-G11 (1984)
- The Clusters NGC 419 and NGC 416 in the Wing of the Small Magellanic Cloud. *Daniel Durand, Eduardo Hardy, and Jorge Melnick.* **283**, 552, 92-G7 (1984)
- Color-Magnitude Diagram Photometry of the LMC Red Cluster NGC 1978. *Edward W. Olszewski.* **284**, 108, 99-B11 (1984)
- Ages of Globular Clusters from Their Luminosity Functions. *Bohdan Paczynski.* **284**, 670, 106-D1 (1984)
- The Evolution of Low-Mass Close Binaries Influenced by the Radiation of Gravitational Waves and by a Magnetic Stellar Wind. *Icko Iben, Jr. and Alexander V. Tutukov.* **284**, 719, 106-G8 (1984)
- Close Visual Binaries. II. Quantitative Test of Isochrones. *Christopher J. Corbally.* **285**, 195, 112-B1 (1984)
- The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. *G. Channugam and A. Ray.* **285**, 252, 112-F3 (1984)
- The Age(s) of the Sculptor Dwarf Galaxy. *G. S. Da Costa.* **285**, 483, 116-F7 (1984)
- Main-Sequence Photometry of the SMC Globular Cluster Kron 3. *R. M. Rich, G. S. Da Costa, and J. R. Mould.* **286**, 517, 128-G1 (1984)
- Yellow Giants in Young Clusters. II. A Comparison of Observation with Theory. *Edward G. Schmidt.* **287**, 261, 135-F11 (1984)
- The Nature of the Embedded Population in the Rho Ophiuchi Dark Cloud: Mid-Infrared Observations. *Charles J. Lada and Bruce A. Wilking.* **287**, 610, 140-G8 (1984)
- On the Evolution of an Intermediate-Mass Zero-Metal Star Which Does Not Experience Thermal Instabilities during the Double Shell Burning Phase. *Alessandro Chieffi and Amedeo Tornambè.* **287**, 745, 142-D10 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. *Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè.* **287**, 749, 142-D14 (1984)
- Supernovae of Type I as End Products of the Evolution of Binaries with Components of Moderate Initial Mass ($M \leq 9 M_{\odot}$). *Icko Iben, Jr. and Alexander V. Tutukov.* **54**, 335, 6-A1 (1984) (Abstr. in **276**, 800, 10-B12)
- The Evolution of Cataclysmic and Low-Mass X-Ray Binaries. *Joseph Patterson.* **54**, 443, 8-A8 (1984) (Abstr. in **278**, 894, 35-E12)
- The Chemical Composition and Evolutionary State of the Early R Stars. *James F. Dominy.* **55**, 27, 11-C1 (1984) (Abstr. in **279**, 909, 47-F14)
- Faint Star Studies in the Magellanic Clouds. II. Field Regions 9° Northeast of the Large Magellanic Cloud Bar. *L. L. Stryker.* **55**, 127, 13-A2 (1984) (Abstr. in **280**, 938, 60-B2)
- BVRI Main-Sequence Photometry of the Globular Cluster M4. *Gonzalo Alcaino and William Liller.* **56**, 19, 22-B5 (1984) (Abstr. in **283**, 905, 96-F12)
- Stars: Faint Blue**
- Optical Counterparts for X-Ray Sources in M31. *D. Crampton, A. P.*

Stars: Faint Blue—Continued

- Cowley, J. B., Hutchings, D. J., Schade, and L. P. van Speybroeck. **284**, 663, 106-C8 (1984)
- The Case Low-Dispersion Northern Sky Survey. II. N. Sanduleak and Peter Pesch. **55**, 517, 17-F13 (1984) (Abstr. in **281**, 892, 72-C5)
- Faint Blue Objects at High Galactic Latitude. IV. Palomar Schmidt Fields Centered on Selected Areas 55 and 94. Ke-Liang Huang and Peter D. Usher. **56**, 393, 28-B1 (1984) (Abstr. in **285**, 875, 121-A6)

Stars: Flare

- The Response of Chromospheric Emission Lines to Flares on YZ Canis Minoris. Simon P. Worden, Timothy J. Schneeberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram. **276**, 270, 3-F14 (1984)
- The Central X-Ray Source in SS 433. J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall. **277**, 286, 14-A13 (1984)
- An Unprecedented UV/Optical Flare in TV Columbae. Paula Szkody and Mario Mateo. **280**, 729, 57-F13 (1984)
- Chromospheric Lines in Red Dwarf Flare Stars. II. EV Lacertae, EQ Pegasi A, and V1054 Ophiuchi. Bjørn R. Pettersen, David S. Evans, and Lawrence A. Coleman. **282**, 214, 76-C4 (1984)
- Ultraviolet and Visible Flare Observations of EQ Pegasi B. Sallie L. Baliunas and John C. Raymond. **282**, 728, 83-A10 (1984)
- Ultraviolet Flare on Lambda Andromedae. S. L. Baliunas, E. F. Guinan, and A. K. Dupree. **282**, 733, 83-B1 (1984)
- An Intercontinental Baseline Coincidence Search for Optical Flashes with Two Schmidt Telescopes. Bradley E. Schaefer, Roland Vanderspeck, Hale V. Bradt, and George R. Ricker. **283**, 887, 96-E8 (1984)
- Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambruster, W. A. Snyder, and K. S. Wood. **284**, 270, 101-A5 (1984)
- The Flare Activity of AD Leonis. Bjørn R. Pettersen, Lawrence A. Coleman, and David S. Evans. **54**, 375, 7-A2 (1984) (Abstr. in **277**, 907, 22-A8)

Stars: Formation

- The Star-forming Region in Cepheus A. V. A. Hughes and J. G. A. Wouterloot. **276**, 204, 3-B2 (1984)
- CO Emission from the Star-Burst Irregular Galaxy NGC 1569. Judith S. Young, J. S. Gallagher, and Deidre A. Hunter. **276**, 476, 6-F13 (1984)
- Anomalous Emission Regions in Irregular Galaxies. Deidre A. Hunter. **276**, L35, 10-E7 (1984)
- Arc Second Resolution Maps of the Compact Sources in Sagittarius B2 and G34.3 + 0.2. J. M. Benson and K. J. Johnston. **277**, 181, 13-A1 (1984)
- Constraints on the Masses of Supernova Progenitors. Robert C. Kennicutt, Jr. **277**, 361, 14-G4 (1984)
- The Propagation and Stability of Time-dependent Galactodetonation Waves. Steven A. Balbus. **277**, 550, 18-A14 (1984)
- Spiral Structure and Star Formation. I. Formation Mechanisms and Mean Free Paths. William W. Roberts, Jr. and Mark Hausman. **277**, 744, 20-C2 (1984)
- Protostellar Formation in Rotating Interstellar Clouds. IV. Nonisothermal Collapse. Alan Paul Boss. **277**, 768, 20-E2 (1984)
- Infrared Observations of Dust Cloud Structure in Young R Associations: NGC 1333, S68, and NGC 7129. Paul M. Harvey, Bruce A. Wilking, and Marshall Joy. **278**, 156, 25-F8 (1984)
- Star Formation in the M8E Region. M. Simon, L. Cassar, M. Felli, J. Fischer, M. Massi, and D. Sanders. **278**, 170, 25-G8 (1984)
- Massive Star Formation in NGC 6946. K. DeGioia-Eastwood, G. L. Grasdale, S. E. Strom, and K. M. Strom. **278**, 564, 32-B1 (1984)
- The Population Structure of the Large Magellanic Cloud Bar. Eduardo Hardy, Roberto Buonanno, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer. **278**, 592, 32-D3 (1984)
- The Formation of Solar Type Stars: IRAS Observations of the Dark Cloud Barnard 5. C. A. Beichman, R. E. Jennings, J. P. Emerson, B. Baud, S. Harris, M. Rowan-Robinson, H. H. Aumann, T. N. Gautier, F. C. Gillett, H. J. Habing, P. L. Marsden, G. Neugebauer, and E. Young. **278**, L45, 29-F3 (1984)
- IRAS Observations near Young Objects with Bipolar Outflows: L1551 and HH 46-47. J. P. Emerson, S. Harris, R. E. Jennings, C. A. Beichman, B. Baud, D. A. Beintema, P. L. Marsden, and P. R. Wesselius. **278**, L49, 29-F7 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius. **278**, L53, 29-F12 (1984)
- IRAS Observations of Shapley-Ames Galaxies. T. de Jong, P. E. Clegg, B. T. Soifer, M. Rowan-Robinson, H. J. Habing, J. R. Houck, H. H. Aumann, and E. Raimond. **278**, L67, 30-C1 (1984)
- The Formation of Massive Stars along the W5 Ionization Front. B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering. **279**,

- 291**, 40-B12 (1984)
- On the Formation of Stars from Disk Accretion. J. A. Mercer-Smith, A. G. W. Cameron, and R. I. Epstein. **279**, 363, 41-A2 (1984)
- Criteria for Collapse and Fragmentation of Rotating, Isothermal Clouds. Shoken M. Miyama, Chushiro Hayashi, and Shinji Narita. **279**, 621, 44-E11 (1984)
- The Evolution of Star-bearing Molecular Clouds: The High-Velocity HCO⁺ Flow in NGC 2071. Alwyn Wootten, Robert B. Loren, Aage Sandqvist, Per Friberg, and Ake Hjalmarson. **279**, 633, 44-F14 (1984)
- Star Formation in the NGC 7538 Molecular Cloud: Near-Infrared and Radio Spectroscopy. Bel Campbell and Rodger I. Thompson. **279**, 650, 45-A5 (1984)
- Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. Irene Cruz-Gonzalez, B. McBreen, and G. G. Fazio. **279**, 679, 45-C6 (1984)
- Dense Cores in Dark Clouds: Young Embedded Stars at 2 Micrometers. P. J. Benson, P. C. Myers, and E. L. Wright. **279**, L27, 42-E13 (1984)
- On the Nonuniqueness of Self-propagating Spiral Galaxy Models. Wendy L. Freedman and Barry F. Madore. **280**, 592, 56-C9 (1984)
- Mass Loss in T Tauri Stars: Observational Studies of the Cool Parts of Their Stellar Winds and Expanding Shells. Reinhard Mundt. **280**, 749, 58-A9 (1984)
- Stochastic Self-propagating Star Formation in Three-dimensional Disk Galaxy Simulations: Erratum. Thomas Statler, Neil Comins, and Bruce Smith. **280**, 937, 60-B1 (1984) (Orig. paper in **270**, 79, 77-G3)
- NGC 6334-V—An Infrared Bipolar Nebula. Paul M. Harvey and Bruce A. Wilking. **280**, L19, 54-D9 (1984)
- Far-Infrared Selected Star Formation Regions. D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran. **281**, 225, 63-D1 (1984)
- Mass Loss from the Proto-Sun: Formation and Evolution of the Solar Nebula. B. M. P. Trivedi. **281**, 375, 65-A9 (1984)
- An Aperture Synthesis Map of HCN Emission Close to W3 IRS 4. Melvyn C. H. Wright, Hélène R. Dickel, and Paul T. P. Ho. **281**, L71, 73-B6 (1984)
- Spiral Instabilities Provoked by Accretion and Star Formation. J. A. Sellwood and R. G. Carlberg. **282**, 61, 74-E12 (1984)
- A Galactic Disk is Not a True Exponential. Philip E. Seiden, Lawrence S. Schulman, and Bruce G. Elmegreen. **282**, 95, 75-A7 (1984)
- Spiral Structure and Star Formation. II. Stellar Lifetimes and Cloud Kinematics. Mark A. Hausman and William W. Roberts, Jr. **282**, 106, 75-B4 (1984)
- Radiatively Driven Dust-bounded Implosion: Formation and Stability of Dense Globules. Maxwell T. Sandford II, Rodney W. Whitaker, and Richard I. Klein. **282**, 178, 75-G10 (1984)
- A Luminous 3 Kiloparsec Infrared Disk in NGC 1068. C. M. Telesco, E. E. Becklin, C. G. Wynn-Williams, and D. A. Harper. **282**, 427, 79-G4 (1984)
- VLA Observations of Collimated Outflow at NGC 7538 IRS 1. Bel Campbell. **282**, L27, 78-C2 (1984)
- Aperture Synthesis Observations of CO Emission from the Nucleus of IC 342. K. Y. Lo, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, C. R. Masson, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **282**, L59, 85-B4 (1984)
- Limits on the Infrared and Visual Luminosity of the Intergalactic H I Cloud in Leo. M. F. Skrutskie, M. A. Shure, and S. Beckwith. **282**, L65, 85-B13 (1984)
- High Angular Resolution CS ($J = 1-0$) Observations of the Bipolar Flow source near NGC 2071: Can the CS Compact Cloud Collimate the Flow? T. Takano, Y. Fukui, H. Ogawa, H. Takaba, R. Kawabe, Y. Fujimoto, K. Sugitani, and M. Fujimoto. **282**, L69, 85-C3 (1984)
- High Angular Resolution CS Observations of the CO Bipolar Flow Source GL 490 with the 45 Meter Telescope. R. Kawabe, H. Ogawa, Y. Fukui, T. Takano, H. Takaba, Y. Fujimoto, K. Sugitani, and M. Fujimoto. **282**, L73, 85-C6 (1984)
- On the Correlation of CO Line and Radio Continuum Emission in Nearby Galaxies and the Efficiency of OB Star Formation. F. P. Israel and M. Rowan-Robinson. **283**, 81, 87-A2 (1984)
- 183 GHz Water Line Variation: An Energetic Outburst in Orion-KL. T. B. H. Kuiper, E. N. Rodriguez Kuiper, P. N. Swanson, Dale F. Dickinson, M. J. Klein, and P. Zimmermann. **283**, 106, 87-B13 (1984)
- Large-Scale Structure of Molecular Gas in Heiles Cloud 2: A Remarkable Rotating Ring. F. Peter Schloerb and Ronald L. Snell. **283**, 129, 87-D8 (1984)
- The Detectability of Population III "Jupiters". H. Karimabadi and L. Blitz. **283**, 169, 87-G11 (1984)
- Velocity-resolved Infrared Spectroscopy of LkHa 101. M. Simon and L. Cassar. **283**, 179, 88-A7 (1984)
- Interferometric Observations of CO in Orion: Hot Core and Plateau. C. R. Masson, G. L. Berge, M. J. Claussen, G. M. Heiligman, R. B. Leighton, K. Y. Lo, A. T. Moffet, T. G. Phillips, A. I. Sargent, S. L.

- Scott, P. G. Wannier, and D. P. Woody. **283**, L37, 97-A14 (1984)
- Bursts of Star Formation in Computer Simulations of Dwarf Galaxies. Neil F. Comins. **284**, 90, 99-A3 (1984)
- A Search for High-Velocity Carbon Monosulfide Emission in Star-Forming Regions. Harley A. Thronson, Jr. and Charles J. Lada. **284**, 135, 99-E4 (1984)
- The Role of the Galactic Magnetic Field in the Evolution of a Dark Globular Filament in Cygnus. David McDavid. **284**, 141, 99-E10 (1984)
- Infrared and Millimeter-Wave Observations of the Sharpless 156 Molecular Cloud. Marshall Joy, Neal J. Evans II, Paul M. Harvey, and Bruce A. Wilking. **284**, 161, 99-G5 (1984)
- On the Fission Theory of Binary Stars. IV. Exact Solutions in Polynomial Spaces. N. R. Lebovitz. **284**, 364, 102-A1 (1984)
- Star Formation Histories of Irregular Galaxies. John S. Gallagher III, Deidre A. Hunter, and Alexander V. Tutukov. **284**, 544, 105-A12 (1984)
- Ongoing Star Formation in NGC 3310: An Infrared Perspective. C. M. Telesco and Ian Gatley. **284**, 557, 105-B12 (1984)
- Far-Infrared and Submillimeter Observations of the Multiple Cores in S255, W3, and OMC-1: Evidence for Fragmentation. D. T. Jaffe, J. A. Davidson, M. Dragoan, and R. H. Hildebrand. **284**, 637, 106-A10 (1984)
- Can the Ballistic Particle Model Explain the Hubble Sequence? David Leisawitz and Frank Bash. **285**, 25, 110-C2 (1984)
- On "The Ambipolar Diffusion Time Scale and the Location of Star Formation in Magnetic Interstellar Clouds": Setting the Record Straight. Telemachos Ch. Mouschovias. **285**, 124, 111-C10 (1984)
- The Formation and Early Dynamical Evolution of Bound Stellar Systems. Charles J. Lada, Michael Margulis, and David Dearborn. **285**, 141, 111-D14 (1984)
- The Galaxy as a Self-regulated Star-forming System: The Case of the OB Associations. José Franco and Steven N. Shore. **285**, 813, 120-C13 (1984)
- Aperture Synthesis Observations of CO Emission from the W3 Molecular Cloud Core. M. J. Claussen, G. L. Berge, G. M. Heiligman, R. B. Leighton, K. Y. Lo, C. R. Masson, A. T. Moffet, T. G. Phillips, A. J. Sargent, S. L. Scott, P. G. Wannier, and D. P. Woody. **285**, L79, 121-G2 (1984)
- X-Ray Emission from M82. M. G. Watson, V. Stanger, and R. E. Griffiths. **286**, 144, 123-D12 (1984)
- The Collapse of the Cores of Slowly Rotating Isothermal Clouds. Susan Terebey, Frank H. Shu, and Patrick Cassen. **286**, 529, 129-A5 (1984)
- High-Resolution Far-Infrared Observations of the Extended W51 Complex. T. N. Rengarajan, L. H. Cheung, G. G. Fazio, K. Shivanandan, and B. McBreen. **286**, 573, 129-D9 (1984)
- Stochastic Models for the Evolution of Open Stellar Systems. Federico Ferrini and Fabio Marchesoni. **287**, 17, 133-B10 (1984)
- Infrared Observations of Interacting/Merging Galaxies. Carol J. Lonsdale, S. E. Persson, and K. Matthews. **287**, 95, 134-A7 (1984)
- Luminous Late-Type Stars in NGC 205. Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett. **287**, 138, 134-D9 (1984)
- Star Cloud Turbulence. R. N. Henriksen and B. E. Turner. **287**, 200, 135-B5 (1984)
- New Radio Sources at AFGL 2591: Young Cluster or Single Star? Bel Campbell. **287**, 334, 136-E10 (1984)
- Transport of Dust and Vapor and Chemical Fractionation in the Early Protosolar Cloud. G. E. Morfill and H. J. Volk. **287**, 371, 137-A7 (1984)
- How to Find Galaxies at High Redshift. Lee W. Hartmann, John P. Huchra, and Margaret J. Geller. **287**, 487, 139-D13 (1984)
- An Estimate of Star Formation Efficiency in Molecular Clouds. T. N. Rengarajan. **287**, 671, 141-E12 (1984)
- Discovery of a Young Stellar Object near the Water Masers in W3(OH). J. L. Turner and W. J. Welch. **287**, L81, 145-E6 (1984)
- The H51 α Emission Associated with the Shocked Gas in Orion-KL. T. Hasegawa and K. Akabane. **287**, L91, 145-E14 (1984)
- Blue and Near-Infrared Surface Photometry of Spiral Structure in 34 Nonbarred Grand Design and Flocculent Galaxies. Debra Meloy Elmegreen and Bruce G. Elmegreen. **54**, 127, 2-E13 (1984) (Abstr. in **275**, 929, 147-F2)
- The Period Distribution of Unevolved Close Binary Systems. G. Giuricin, F. Mardirossian, and M. Mezzetti. **54**, 421, 7-E5 (1984) (Abstr. in **277**, 908, 22-A9)
- Faint Star Studies in the Magellanic Clouds. II. Field Regions 9° Northeast of the Large Magellanic Cloud Bar. L. L. Stryker. **55**, 127, 13-A2 (1984) (Abstr. in **280**, 938, 60-B2)
- A Deep Photometric Study of IC 5146. Juan C. Forte and Ana M. Orsatti. **56**, 211, 25-B13 (1984) (Abstr. in **284**, 869, 108-E1)
- Stars: High-Velocity**
- HD 46703: A High-Luminosity Population II F-Type Star. R. Earle Luck and Howard E. Bond. **279**, 729, 45-G2 (1984)
- Stars: Horizontal Branch**
- On the Metallicity of Blue Horizontal-Branch Stars in M4 and NGC 6397. K. Kodaira and A. G. Davis Philip. **278**, 201, 26-B12 (1984)
- High-Dispersion Spectroscopic Investigation of Field Horizontal-Branch, High-Luminosity, and Main-Sequence Stars. K. Kodaira and A. G. Davis Philip. **278**, 208, 26-C6 (1984)
- AB Stars in the Southern Galactic Halo. III. Kinematics of the Halo. Jeffrey R. Pier. **281**, 260, 63-F8 (1984)
- Stars: Hydrogen Deficient**
- LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? D. Schönberner and J. S. Drilling. **276**, 229, 3-D1 (1984)
- Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray. **278**, 224, 26-D8 (1984)
- Broad-Band Photometry of Extreme Helium Stars. J. S. Drilling, A. U. Landolt, and D. Schönberner. **279**, 748, 46-A7 (1984)
- Very Nonadiabatic Radial Pulsations in Luminous Helium Stars. Hideyuki Saio, J. Craig Wheeler, and John P. Cox. **281**, 318, 64-D4 (1984)
- Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. Sumner Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell. **281**, 800, 71-C4 (1984)
- Line Identifications in the Ultraviolet (2590–3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton. **283**, 760, 95-C2 (1984)
- Stars: Individual** (arranged by Constellation name, by Bright Star Number, by Henry Draper Number, and by Other Designation)
- By Constellation Name*
- Ultraviolet Flare on Lambda Andromedae. S. L. Baliunas, E. F. Guinan, and A. K. Dupree. **282**, 733, 83-B1 (1984)
- The Triple Star Zeta Aquarii. W. D. Heintz. **284**, 806, 107-F3 (1984)
- The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thronson, Jr. **281**, 303, 64-C1 (1984)
- VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips. **278**, 220, 26-D4 (1984)
- [UX Arietis] A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. G. A. Doschek and R. D. Cowan. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- [α Aurigae] XUV Observations of Capella and the Local Interstellar Medium. Norman Bobroff, John Nousek, and Gordon Garmire. **277**, 678, 19-E3 (1984)
- [α Aurigae] The Many Faces of Capella: A Search for Rotational Modulations and a Study of Systematic Velocities of Emission Lines in the Ultraviolet. Thomas R. Ayres. **284**, 784, 107-E7 (1984)
- [α Aurigae] A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. G. A. Doschek and R. D. Cowan. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 200 Microns. D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga. **284**, 799, 107-F8 (1984)
- The Epsilon Aurigae Secondary: A Binary Embedded within a Disk? Jack J. Lissauer and Dana E. Backman. **286**, L39, 132-D10 (1984)
- Asymmetries in the Spectral Lines of Procyon and κ Cancri. John B. Rice and William H. Wehlau. **278**, 721, 33-G1 (1984)
- An Analysis by Wavelength Coincidence Statistics of the Ultraviolet Spectrum of Kappa Cancri. George T. Chionacki, Charles R. Cowley, and Donald J. Bord. **286**, 736, 131-B11 (1984)
- S Cancri: A Semidetached System with a Very Low Mass Secondary. Daniel M. Popper and Jocelyn Tomkin. **285**, 208, 112-B14 (1984)
- Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. Arthur N. Cox, Bernard J. McNamara, and William Ryan. **284**, 250, 100-F13 (1984)
- [α Lyrae] On the Nature of the Material Surrounding Vega. D. A. Harper, R. F. Loewenstein, and J. A. Davidson. **285**, 808, 120-C8 (1984)
- A Spectroscopic Study and Mass Determination for the Cataclysmic Variable AC Cancri. Eric M. Schlegel, Ronald H. Kitchuck, and R. Kent Honeycutt. **280**, 235, 51-E10 (1984)
- [α Canis Majoris] The Far-Ultraviolet Energy Distribution of Sirius B from Voyage-2. J. B. Holberg, F. Wesemael, and I. Hebeny. **280**, 679, 57-C5 (1984)
- [α Canis Majoris] Effective Temperatures and Surface Gravities of Metallic-Line A Stars. M. C. Lane and John B. Lester. **281**, 723, 70-D7 (1984)
- The Response of Chromospheric Emission Lines to Flares on YZ Canis Minoris. Simon P. Worden, Timothy J. Schneeberger, Mark S. Giampapa, Edward E. Deluca, and Lawrence E. Cram. **276**, 270,

Stars: Individual - Continued

- 3-F14 (1984)
- [α Canis Minoris] Asymmetries in the Spectral Lines of Procyon and κ Cancri. John B. Rice and William H. Wehlau. **278**, 721, 33-G1 (1984)
- Time Variations of the Ha Line Profile from the Core of Eta Carinae. Maria Teresa Ruiz, Jorge Melnick, and Patricio Ortiz. **285**, L19, 114-G5 (1984)
- An Investigation of the Stellar Association Containing the 1.95 Day Cepheid SU Cassiopeiae. David G. Turner and Nancy Remage Evans. **283**, 254, 88-F13 (1984)
- Comparison of Variations in the Visible and Ultraviolet Spectra of a Centauri. Richard P. Fahey. **55**, 507, 17-F3 (1984) (Abstr. in **281**, 892, 72-C5)
- Interactions between Pre-Main-Sequence Objects and Molecular Clouds. II. PV Cephei. Russell M. Leveault. **277**, 634, 19-A6 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). J. S. Miller, F. O. Clark, and T. H. Troland. **287**, 892, 144-A7 (1984)
- An Unprecedented UV/Optical Flare in TV Columbae. Paula Szkody and Mario Mateo. **280**, 729, 57-F13 (1984)
- A Spectroscopic Study of the Peculiar Giant FK Comae. I. The Radial Velocity Variation and Its Implications. James K. McCarthy and Lawrence W. Ramsey. **283**, 200, 88-B14 (1984)
- [R Corona Australis] Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. Irene Cruz-Gonzalez, B. McBrean, and G. G. Fazio. **279**, 679, 45-C6 (1984)
- [TV Corona Australis] Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. Irene Cruz-Gonzalez, B. McBrean, and G. G. Fazio. **279**, 679, 45-C6 (1984)
- Observations of the O'Connell Effect System VY Crucis. E. F. Milone and B. J. Hrivnak. **56**, 295, 27-A2 (1984) (Abstr. in **285**, 874, 121-A5)
- The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- X Cygni: Duplicity, Period Stability, and Atmospheric Velocity Structure. Nancy Remage Evans. **281**, 760, 70-G2 (1984)
- Time-resolved Spectroscopy of SS Cygni at Minimum and Maximum Light. F. V. Hessman, E. L. Robinson, R. E. Nather, and E.-H. Zhang. **286**, 747, 131-C8 (1984)
- The Evolution of the Optical Spectrum of the Dwarf Nova SS Cygni over One Complete Outburst Cycle. John T. Clarke, Debbie Capel, and Stuart Bowyer. **287**, 845, 143-D14 (1984)
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XXXIX. The Structure of the Eclipsing Wolf-Rayet Binary V444 Cygni as Derived from Light Curves between 2460 Å and 3.5 Microns. A. M. Cherepashchuk, Joel A. Eaton, and Kh. F. Khalilullin. **281**, 774, 71-A4 (1984)
- The $^{12}\text{C}/^{13}\text{C}$ Ratio of the Carbon Star V460 Cygni Revisited. Irene R. Little-Marenin and Stephen J. Little. **283**, 188, 88-B2 (1984)
- [V1016 Cygni] Evolution of the Optical Spectrum of HM Sagittae: 1977-1982. John R. Stauffer. **280**, 695, 57-D7 (1984)
- SAS 3 Observations of Cygnus X-1: The Intensity Dips. Ronald A. Remillard and Claude R. Canizares. **278**, 761, 34-C3 (1984)
- High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres. **283**, 731, 95-A1 (1984)
- IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. R. Viotti, A. Altamore, G. B. Baratta, A. Castelletta, and M. Friedjung. **283**, 226, 88-D13 (1984)
- Helium Content of the Population II Binary System CM Draconis. Bohdan Paczyński and Ryszard Sienkiewicz. **286**, 332, 125-E3 (1984)
- Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)
- IR Geminorum: Indications of a Massive White Dwarf and a Heated Secondary in this New SU Ursae Majoris Cataclysmic Variable. Paula Szkody, Allen W. Shafter, and Anne P. Cowley. **282**, 236, 76-D12 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes. **279**, 177, 39-A1 (1984)
- Models of the Hard X-Ray Spectrum of AM Herculis and Implications for the Accretion Rate. J. H. Swank, A. C. Fabian, and R. R. Ross. **280**, 734, 57-G3 (1984)
- IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovák, P. M. Gondhalekar, and J. W. Truran. **281**, 194, 63-A12 (1984)
- Observations of Quasi-periodic Oscillations in the Light Curve of VV Hydr. Edward L. Robinson and Brian Warner. **277**, 250, 13-E14 (1984)
- Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambruster, W. A. Snyder, and K. S. Wood. **284**, 270, 101-A5 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson. **276**, 572, 7-G4 (1984)
- Radial Velocity Studies of Cataclysmic Binaries. II. The Ultrashort Period Dwarf Nova T Leonis. Allen W. Shafter and Paula Szkody. **276**, 305, 4-B7 (1984)
- A Radial Velocity Study of XY Leonis. B. J. Hrivnak, E. F. Milone, G. Hill, and W. A. Fisher. **285**, 683, 119-A4 (1984)
- The Flare Activity of AD Leonis. Björn R. Pettersen, Lawrence A. Coleman, and David S. Evans. **54**, 375, 7-A2 (1984) (Abstr. in **277**, 907, 22-A8)
- The FK Comae Candidate UZ Librae. Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley. **285**, 202, 112-B8 (1984)
- Discovery of a Shell around Alpha Lyrae. H. H. Aumann, F. C. Gillett, C. A. Beichman, T. de Jong, J. R. Houck, F. J. Low, G. Neugebauer, R. G. Walker, and P. R. Wesselius. **278**, L23, 29-D12 (1984)
- [α Orionis] Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson. **284**, 223, 100-D14 (1984)
- On the Extended Chromosphere of α Orionis. L. Hartmann and E. H. Avrett. **284**, 238, 100-F1 (1984)
- Characteristics of the Fe II and C II Emission in High-Resolution IUE Spectra (2300-3000 Å) of Alpha Orionis. Kenneth G. Carpenter. **285**, 181, 112-A1 (1984)
- [α Orionis] Variations of Betelgeuse's Optical Linear Polarization over Four Consecutive Observing Seasons: 1979-1983. Daniel P. Hayes. **55**, 179, 13-E6 (1984) (Abstr. in **280**, 940, 60-B4)
- Rotational Modulation of the Chromospheric Activity in χ^1 Orionis (G0 V). Ann Merchant Boesgaard and Theodore Simon. **277**, 241, 13-E5 (1984)
- The Morphology of a Mass Loss Episode of the Be Star ω Orionis. Daniel P. Hayes and Edward F. Guinan. **279**, 721, 45-F8 (1984)
- Absolute Dimensions and Masses of Eclipsing Binaries. IV. EE Pegasi Is a Triple Star. Claud H. Lacy and Daniel M. Popper. **281**, 268, 63-G2 (1984)
- Ultraviolet and Visible Flare Observations of EQ Pegasi B. Sallie L. Baliunas and John C. Raymond. **282**, 728, 83-A10 (1984)
- Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry. **282**, 226, 76-D2 (1984)
- X-Ray Observations of X Persei. M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Narayan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland. **278**, 711, 33-F5 (1984)
- Observations, Analysis, and Absolute Parameters of the Evolved Binary AI Phoenicis. B. J. Hrivnak and E. F. Milone. **282**, 748, 83-C3 (1984)
- VV Puppis: The Soft X-Ray Machine. Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White. **279**, 785, 46-D3 (1984)
- WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne. **282**, 763, 83-D4 (1984)
- The Radio Structure of HM Sagittae. Sun Kwok, R. C. Bignell, and C. R. Purton. **279**, 188, 39-A12 (1984)
- Evolution of the Optical Spectrum of HM Sagittae: 1977-1982. John R. Stauffer. **280**, 695, 57-D7 (1984)
- The Spectrum of V348 Sagittarii. Oved Dahari and Donald E. Osterbrock. **277**, 648, 14-B7 (1984)
- The Baade-Wesselink Method and the Distances to RR Lyrae Stars. I. The Field Star VY Serpentis. Bruce W. Carney and David W. Latham. **278**, 241, 26-E11 (1984)
- High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. Gary L. Grasdal, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castellet. **283**, L57, 97-C6 (1984)
- Comments on the Ultraviolet Spectrum of γ^2 Velorum. Jorge Sahade, Yoji Kondo, and George E. McCluskey, Jr. **276**, 281, 3-G11 (1984)
- Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenlid. **281**, 766, 70-G8 (1984)
- By Bright Star Number
- The RS Canum Venaticorum Phenomena. I. Ha Emission in HR 1099. Dorothy A. Fraquelli. **276**, 243, 3-E1 (1984)

- VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips. **278**, 220, 26-D4 (1984)
- Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips. **279**, 184, 39-A8 (1984)
- By Henry Draper Number
- Spectroscopic Evidence for Starspots in the G Dwarf HD 1835. Bruce Campbell and Roger Cayrel. **283**, L17, 91-F5 (1984)
- Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambruster, W. A. Snyder, and K. S. Wood. **284**, 270, 101-A5 (1984)
- [HD 15165] The Remarkable Multiple Mode δ Scuti Star BDS 1269A. Bernard J. McNamara and Stephen J. Horan. **282**, 741, 83-B9 (1984)
- HD 46703: A High-Luminosity Population II F-Type Star. R. Earle Luck and Howard E. Bond. **279**, 729, 45-G2 (1984)
- The Influence of Electron Scattering on the He II Line Profiles of HD 50896. D. J. Hillier. **280**, 744, 58-A1 (1984)
- [HD 77581] Spectral Variability in Early-Type Binary X-Ray Systems. Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson. **282**, 245, 76-E7 (1984)
- [HD 97950] On the Nature of the Wolf-Rayet Component in the Core of the Massive Galactic H II Region NGC 3603. Anthony F. J. Moffat and Virpi S. Niemela. **284**, 631, 106-A4 (1984)
- [HD 125823] Comparison of Variations in the Visible and Ultraviolet Spectra of a Centauri. Richard P. Fahey. **55**, 507, 17-F3 (1984) (Abstr. in **281**, 892, 72-C5)
- New Results for HD 161796. J. D. Fernie and R. F. Garrison. **285**, 698, 119-B5 (1984)
- Line Identifications in the Ultraviolet (2590–3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton. **283**, 760, 95-C2 (1984)
- A Long-Period Orbit for the Binary Wolf-Rayet Star HD 193793. WC7 + O4–5. Robert Lamontagne, Anthony F. J. Moffat, and Wilhelm Seggewiss. **277**, 258, 13-F10 (1984)
- Spectroscopic Studies of Wolf-Rayet Stars with Absorption Lines. VIII. HD 193793. Peter S. Conti, Diane Roussel-Duprè, Philip Massey, and Michael Rensung. **282**, 693, 82-E11 (1984)
- [HDE 320156] LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? D. Schönberner and J. S. Drilling. **276**, 229, 3-D1 (1984)
- Ultraviolet and Optical Spectroscopy of Cn 1-1 (= HDE 330036). Julie H. Lutz. **279**, 714, 45-E13 (1984)
- By Other Designation: Names
- Feige 24: Wind/Flare Accretion by a Hot Dazl Degenerate. E. M. Sion and S. G. Starrfield. **286**, 760, 131-D7 (1984)
- Metal Abundances in the Hot DA White Dwarfs Wolf 1346 and Feige 24. F. Wesemael, R. B. C. Henry, and H. L. Shipman. **287**, 868, 143-F11 (1984)
- By Other Designation: Alphanumeric
- The Ultra-Metal-deficient (Population III?) Red Giant CD – 38°245. M. S. Bessell and John Norris. **285**, 622, 118-C11 (1984)
- Ultraviolet and Optical Spectroscopy of Cn 1-1 (= HDE 330036). Julie H. Lutz. **279**, 714, 45-E13 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 – 451 in the High and Low States. L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips. **285**, 214, 112-C6 (1984)
- E2003 + 225: A 3^{d42m} AM Herculis Type Binary System. J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal. **277**, 682, 19-E7 (1984)
- GD 323: A White Dwarf with a Stratified H/He Atmosphere? James Liebert, F. Wesemael, E. M. Sion, and G. Wegner. **277**, 692, 19-F3 (1984)
- The ZZ Ceti Star GD 385 Revisited. S. O. Kepler. **278**, 754, 34-B10 (1984)
- Light and Line Profile Variations due to r -Mode Pulsations with an Application to the ZZ Ceti Star G117–B15A. S. O. Kepler. **286**, 314, 125-C13 (1984)
- The Magnetic Field of the AM Herculis Object H0139-68. D. T. Wickramasinghe, N. Visvanathan, and I. R. Tuohy. **286**, 328, 125-D13 (1984)
- CN and C_2H in IRC +10216. P. J. Huggins, A. E. Glassgold, and Mark Morris. **279**, 284, 40-B5 (1984)
- Infrared Pumping for HC_3N in the Circumstellar Envelope of IRC +10216. Shuji Deguchi and Masakatsu Uyemura. **285**, 153, 111-E12 (1984)
- The Distribution of HCN in the Circumstellar Envelope of IRC +10216. J. H. Bieging, B. Chapman, and W. J. Welch. **285**, 656, 118-F3 (1984)
- New Spectrophotometry of the Extremely Cool Proper Motion Star LHS 2924. James Liebert, Todd A. Boroson, and Mark S. Giampapa. **282**, 758, 83-C13 (1984)
- Two-Frequency Radio Spectra during the Outburst of the Periodic Radio Star LSI +61°303. A. R. Taylor and P. C. Gregory. **283**, 273, 89-A6 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 – 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibasaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- Discovery of a 7.1 Hour Period and Eclipses from MXB 1659 – 29. L. R. Cominsky and K. S. Wood. **283**, 765, 95-C8 (1984)
- MXB 1916 – 053/4U 1915 – 05: Burst Properties and Constraints on a 50 Minute Binary Secondary. J. H. Swank, R. E. Taam, and N. E. White. **277**, 274, 14-A1 (1984)
- PG 1012 – 029: A High-Excitation Eclipsing Cataclysmic Variable. William R. Penning, Donald H. Ferguson, John T. McGraw, James Liebert, and Richard F. Green. **276**, 233, 3-D5 (1984)
- [PG 1707 + 427] Two New Extremely Hot Pulsating White Dwarfs. Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert. **279**, 751, 46-A10 (1984)
- [PG 2131 + 066] Two New Extremely Hot Pulsating White Dwarfs. Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert. **279**, 751, 46-A10 (1984)
- Constraints on the Progenitor Binary System for PSR 1913 + 16. J. M. Cordes and I. Wasserman. **279**, 798, 46-E2 (1984)
- Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. G. Hammerschlag-Hensberge, T. R. Kallman, and I. D. Howarth. **283**, 249, 88-F8 (1984)
- Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. G. Hammerschlag-Hensberge, T. R. Kallman, and I. D. Howarth. **283**, 249, 88-F8 (1984)
- The Central X-Ray Source in SS 433. J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall. **277**, 286, 14-A13 (1984)
- Rapid Intensity Variability in the Jets of SS 433. Bruce Margon, Scott F. Anderson, Lawrence H. Aller, Ronald A. Downes, and Charles D. Keyes. **281**, 313, 64-C13 (1984)
- Line Locking and SS 433. Miriam Pekarevich, Tsvi Piran, and Jacob Shaham. **283**, 295, 88-C3 (1984)
- On the Origin of X-Ray Variability of SS 433. David L. Band and Jonathan E. Grindlay. **285**, 702, 119-B11 (1984)
- The Infrared Dust Shell around the WC9 Star Ve 2-45. H. M. Dyck, Theodore Simon, and R. D. Wolstencroft. **277**, 675, 19-D14 (1984)
- [3U 1118 – 60] A Study of the Spectra and Pulse Profiles of Centaurus X-3 from Hakucho. R. Lieu, D. Venkatesan, and K. Mitani. **282**, 709, 82-F14 (1984)
- The 41.5 Day Binary X-Ray Pulsar 4U 1223 – 62 (GX 301 – 2). N. E. White and J. H. Swank. **287**, 856, 143-E13 (1984)
- [4U 1659-48] Short-Term X-Ray Variability of GX 339-4. Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi. **285**, 712, 119-C7 (1984)
- Discovery of a 176 Day Period in 4U 1820 – 30. W. Friedhorsky and J. Terrell. **284**, L17, 103-B4 (1984)
- MXB 1916 – 053/4U 1915 – 05: Burst Properties and Constraints on a 50 Minute Binary Secondary. J. H. Swank, R. E. Taam, and N. E. White. **277**, 274, 14-A1 (1984)
- Stars: Interiors
- A Convective Model for Turbulent Mixing in Rotating Convection Zones. David H. Hathaway. **276**, 316, 4-C4 (1984)
- The Role of Flux Ejection in Stellar Dynamos. E. N. Parker. **276**, 341, 4-E1 (1984)
- Effect of Initial Thermal Structure on the Collapse and Explosion of Iron Stellar Cores. I. Lichtenstadt and S. A. Bludman. **276**, 746, 9-E14 (1984)
- Convection in Pulsating Stars. III. The RR Lyrae Instability Strip. R. F. Stellingwerf. **277**, 322, 14-D7 (1984)
- Convection in Pulsating Stars. IV. Nonlinear Effects. R. F. Stellingwerf. **277**, 327, 14-D12 (1984)
- On the Frequency of Planetary Nebula Nuclei Powered by Helium Burning and on the Frequency of White Dwarfs with Hydrogen-deficient Atmospheres. Icko Iben, Jr. **277**, 333, 14-E4 (1984)
- Cosmological Consequences of Population III Stars. B. J. Carr, J. R. Bond, and W. D. Arnett. **277**, 445, 17-A5 (1984)
- Models of Lower-Main-Sequence Stars. Gerald D. Neece. **277**, 738, 20-B10 (1984)
- Evolution of 8–10 M_{\odot} Stars toward Electron Capture Supernovae. I. Formation of Electron-Degenerate O + Ne + Mg Cores. Ken'ichi

Stars: Interiors—Continued

- Nomoto. **277**, 791, 20-F11 (1984)
- Carbon in the Cool DC and C₂ White Dwarfs: Dredge-up in Compositionally Stratified Envelopes. *G. Fontaine, B. Villeneuve, F. Wesemael, and G. Wegner*. **277**, L61, 22-F12 (1984)
- Departures from Thermal Equilibrium in Expanding Stars. *Charles A. Whitney*. **278**, 310, 27-D2 (1984)
- Theoretical Zero-Age Main Sequences Applied to the Pleiades, Praesepe, and Hyades Star Clusters. *Don A. Vandenberg and Terry J. Bridges*. **278**, 679, 33-C14 (1984)
- Diffusion in White Dwarf Stars. *David Muchmore*. **278**, 769, 34-C11 (1984)
- Thermal Evolution of Accreting Neutron Stars. *Masayuki Y. Fujimoto, Tomoyuki Hanawa, Icko Iben, Jr., and M. B. Richardson*. **278**, 813, 34-F13 (1984)
- On the Formation of Stars from Disk Accretion. *J. A. Mercer-Smith, A. G. W. Cameron, and R. I. Epstein*. **279**, 363, 41-A2 (1984)
- Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. *Monique Tassoul and Jean-Louis Tassoul*. **279**, 384, 41-B9 (1984)
- Diffusion-induced Hydrogen Burning in Helium-rich White Dwarfs. *G. Michaud, G. Fontaine, and Y. Charland*. **280**, 247, 51-F8 (1984)
- Models for Type I Supernovae: Partially Incinerated White Dwarfs. *Peter G. Sutherland and J. Craig Wheeler*. **280**, 282, 52-B2 (1984)
- Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. *Peter Bodenheimer and Ronald E. Taam*. **280**, 771, 58-C7 (1984)
- Rapid Expansion of Polytropes. *Aaron Barnes and Alan Paul Boss*. **280**, 819, 58-F13 (1984)
- The Evolution and Fate of Very Massive Objects. *J. R. Bond, W. D. Arnett, and B. J. Carr*. **280**, 825, 58-G5 (1984)
- On Stellar Models with an Isothermal Core in the Presence of a Magnetic Field. *M. K. Das, Jayanta Kar, and J. N. Tandon*. **281**, 292, 64-B4 (1984)
- The Effect of Diffusion on Pre-nova Evolution: CNO-enriched Envelopes. *Dina Prialnik and Attay Kovetz*. **281**, 367, 65-A1 (1984)
- Oxygen Isotopes in the Atmospheres of Betelgeuse and Antares. *Michael J. Harris and David L. Lambert*. **281**, 739, 70-E9 (1984)
- Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. *Sumner Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell*. **281**, 800, 71-C4 (1984)
- Very Slow Classical Cepheids: Theoretical Models with Periods Longer than 50 Days. *T. Richard Carson and Richard B. Stothers*. **281**, 811, 71-D1 (1984)
- The Lithium Abundance: Constraints on Stellar Evolution. *G. Michaud, G. Fontaine, and G. Beaudet*. **282**, 206, 76-B10 (1984)
- Two- and Three-Dimensional Numerical Simulations of the Core Helium Flash. *Robert G. Deupree*. **282**, 274, 76-G8 (1984)
- Turbulent Compressible Convection in a Deep Atmosphere. II. Two-Dimensional Results for Main-Sequence A5 and F0 Type Envelopes. *Sabatino Sofia and Kwong L. Chan*. **282**, 550, 81-B4 (1984)
- Convection in the Envelopes of Red Giants. *H. M. Anita, S. M. Chitre, and D. Narasimha*. **282**, 574, 81-C14 (1984)
- Diffusion in a Thermally Pulsating Star. *Attay Kovetz, Dina Prialnik, and Giora Shaviv*. **282**, 584, 81-D10 (1984)
- Cooling of Low-Mass Carbon-Oxygen Dwarfs from the Planetary Nucleus Stage through the Crystallization Stage. *Icko Iben, Jr. and Alexander V. Tutukov*. **282**, 615, 81-F13 (1984)
- The Lithium Abundance of Hyades Main-Sequence Stars. *Roger Cayrel, Giusa Cayrel de Strobel, Bruce Campbell, and Werner Däppen*. **283**, 205, 88-C5 (1984)
- The Lower Main Sequence and the Nature of Secondary Stars in Ultracompact Binaries. *S. Rappaport and P. C. Joss*. **283**, 232, 88-E5 (1984)
- Is the Metal Contribution to the Astrophysical Opacity Incorrect? *N. H. Magee, Jr., A. L. Merts, and W. F. Huebner*. **283**, 264, 88-G10 (1984)
- On the Production of Technetium in Thermally Pulsing Red Giant Stars. *Kenneth R. Cosner, Keith H. Despain, and James W. Truran*. **283**, 313, 89-D7 (1984)
- Diffusion-induced Hydrogen Burning and the Evolution of DA White Dwarfs. *G. Michaud and G. Fontaine*. **283**, 787, 95-E2 (1984)
- Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. *David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson*. **284**, 223, 100-D14 (1984)
- Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. *Arthur N. Cox, Bernard J. McNamara, and William Ryan*. **284**, 250, 100-F13 (1984)
- Analyses of the Visual Spectra of White Dwarfs Containing Carbon. *G. Wegner and F. H. Yackovich*. **284**, 257, 100-G6 (1984)
- Convection in Pulsating Stars. V. Limit Cycle Characteristics. *R. F. Stellingwerf*. **284**, 712, 106-G1 (1984)
- Close Visual Binaries. II. Quantitative Test of Isochrones. *Christopher J. Corbally*. **285**, 195, 112-B1 (1984)
- Oxygen Isotopic Abundances in the Atmospheres of Seven Red Giant Stars. *Michael J. Harris and David L. Lambert*. **285**, 674, 118-G7 (1984)
- Magnetorotational Iron Core Collapse. *Eugene M. D. Symbalisty*. **285**, 729, 119-D10 (1984)
- Do Monopoles Keep White Dwarfs Hot? *Katharine Freese*. **286**, 216, 124-C8 (1984)
- Lateral Propagation of the Helium Shell Flash on an Accreting Neutron Star. *Toshiya Nozakura, Satoru Ikeuchi, and Masayuki Y. Fujimoto*. **286**, 221, 124-C13 (1984)
- Helium Content of the Population II Binary System CM Draconis. *Bohdan Paczyński and Ryszard Sienkiewicz*. **286**, 332, 125-E3 (1984)
- Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. *Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi*. **286**, 644, 130-B14 (1984)
- Magnetic Fields in the Radiative Interior of Stars. I. Thermal Shadows and Forced Convection. *E. N. Parker*. **286**, 666, 130-D8 (1984)
- Magnetic Fields in the Radiative Interior of Stars. II. Forced Convection and the ⁷Li Abundance. *E. N. Parker*. **286**, 677, 130-E5 (1984)
- Two- and Three-dimensional Numerical Simulations of the Hydrodynamic Phase of the Core Helium Flash. *Robert G. Deupree*. **287**, 268, 135-G5 (1984)
- On the Evolution of an Intermediate-Mass Zero-Metal Star Which Does Not Experience Thermal Instabilities during the Double Shell Burning Phase. *Alessandro Chieffi and Amedeo Tornambè*. **287**, 745, 142-D10 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. *Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè*. **287**, 749, 142-D14 (1984)
- Similar Photospheres, Different Mantles: A Study of Four O Stars. *Anne B. Underhill*. **287**, 874, 143-G3 (1984)
- The ¹³N(p,γ)¹⁴O Thermonuclear Reaction Rate and the Hot CNO Cycle. *G. J. Mathews and F. S. Dietrich*. **287**, 969, 144-G1 (1984)
- Supernovae of Type I as End Products of the Evolution of Binaries with Components of Moderate Initial Mass ($M \leq 9 M_{\odot}$). *Icko Iben, Jr. and Alexander V. Tutukov*. **54**, 335, 6-A1 (1984) (Abstr. in **276**, 800, 10-B12)
- Accurate Integrations of the Roche Model. *Stefan W. Mochnacki*. **55**, 551, 19-A9 (1984) (Abstr. in **282**, 820, 84-A10)
- Stars: Late-Type**
- An Analysis of the Vaughan-Preston Survey of Chromospheric Emission. *L. Hartmann, D. R. Soderblom, R. W. Noyes, N. Burnham, and A. H. Vaughan*. **276**, 254, 3-E12 (1984)
- Observations of Magnetic Fields on Solar-Type Stars. *Geoffrey W. Marcy*. **276**, 286, 4-A2 (1984)
- A Photometric Comparison of Late-Type Cluster Supergiants in the Magellanic Clouds and the Galaxy. *P. J. McGregor and A. R. Hyland*. **277**, 149, 12-E7 (1984)
- Models of Lower-Main-Sequence Stars. *Gerald D. Neece*. **277**, 738, 20-B10 (1984)
- Observations and Analysis of Circumstellar Cyanoacetylene. *P. R. Jewell and L. E. Snyder*. **278**, 176, 26-A1 (1984)
- IRAS Observations of OH/IR Stars. *F. M. Olmon, B. Baud, H. J. Habing, T. de Jong, S. Harris, and S. R. Pottasch*. **278**, L41, 29-E13 (1984)
- Sigma Geminorum (K1 III + ?): Variability of the Ultraviolet Lines near Conjunction. *Thomas R. Ayres, Theodore Simon, and Jeffrey L. Linsky*. **279**, 197, 39-B8 (1984)
- On the Dispersion in Brightness of Far-Ultraviolet Emission Lines of Cool Giant Stars. *Theodore Simon*. **279**, 738, 45-G11 (1984)
- A Note on the Magnetic Field Strengths on the Surfaces of Cool Dwarfs. *D. J. Mullan*. **279**, 746, 46-A5 (1984)
- Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. *R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan*. **279**, 763, 46-B8 (1984)
- Optical and Infrared Photometry of Late-Type Stars in the Pleiades. *John R. Stauffer*. **280**, 189, 51-B3 (1984)
- Rotational Velocities of Low-Mass Stars in the Pleiades. *John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham*. **280**, 202, 51-C4 (1984)
- The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. *S. Beckwith, S. C. Beck, and J. Gatley*. **280**, 648, 57-A1 (1984)
- Energy Balance of Stellar Coronae. III. Effect of Stellar Mass and Radius. *Reiner Hammer*. **280**, 780, 58-D3 (1984)
- Magnetic Field Observations of Evolved Stars. *Geoffrey W. Marcy and David H. Bruning*. **281**, 286, 64-A12 (1984)

- Oxygen Isotopes in the Atmospheres of Betelgeuse and Antares. *Michael J. Harris and David L. Lambert*. **281**, 739, 70-E9 (1984)
- The 1982 Eclipse of 31 Cygni. *Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman*. **281**, 751, 70-F7 (1984)
- The Applicability of the Fourier Convolution Theorem to the Analysis of Late-Type Stellar Spectra. *David H. Bruning*. **281**, 830, 71-E7 (1984)
- Multiple Circumstellar Shells and Radiation Pressure on Grains in the Outflow from Late-Type Stars. *M. Jura*. **282**, 200, 76-B4 (1984)
- Chromospheric Lines in Red Dwarf Flare Stars. II. EV Lacertae, EQ Pegasi A, and V1054 Ophiuchi. *Björn R. Pettersen, David S. Evans, and Lawrence A. Coleman*. **282**, 214, 76-C4 (1984)
- Convection in the Envelopes of Red Giants. *H. M. Anita, S. M. Chitre, and D. Narasimha*. **282**, 574, 81-C14 (1984)
- On the Possibility of Resonant Electrodynamical Coupling in the Coronae of Red Dwarfs. *D. J. Mullan*. **282**, 603, 81-F1 (1984)
- Cooling of Low-Mass Carbon-Oxygen Dwarfs from the Planetary Nucleus Stage through the Crystallization Stage. *Icko Iben, Jr. and Alexander V. Tutukov*. **282**, 615, 81-F13 (1984)
- Rapid Rotation and H α Emission Anomalies among Some Members of the Population of Low-Mass Stars. *Arthur Young, Andrew Skumanich, and Eugene Harlan*. **282**, 683, 82-D13 (1984)
- New Spectrophotometry of the Extremely Cool Proper Motion Star LHS 2924. *James Liebert, Todd A. Boroson, and Mark S. Giampapa*. **282**, 758, 83-C13 (1984)
- Lithium in Late-Type Giants. III. The Weak G Band Giants. *David L. Lambert and Scott R. Sawyer*. **283**, 192, 88-B6 (1984)
- A Spectroscopic Study of the Peculiar Giant FK Comae. I. The Radial Velocity Variation and Its Implications. *James K. McCarthy and Lawrence W. Ramsey*. **283**, 200, 88-B14 (1984)
- Color Anomalies and Starspots in Hyades Dwarfs. *Bruce Campbell*. **283**, 209, 88-C9 (1984)
- The Lower Main Sequence and the Nature of Secondary Stars in Ultracompact Binaries. *S. Rappaport and P. C. Joss*. **283**, 232, 88-E5 (1984)
- Carotating Interaction Regions in Stellar Winds. *D. J. Mullan*. **283**, 303, 89-C11 (1984)
- On the Production of Technetium in Thermally Pulsing Red Giant Stars. *Kenneth R. Cosner, Keith H. Despain, and James W. Truran*. **283**, 313, 89-D7 (1984)
- High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. *A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres*. **283**, 731, 95-A1 (1984)
- Spectroscopic Evidence for Starspots in the G Dwarf HD 1835. *Bruce Campbell and Roger Cayrel*. **283**, L17, 91-F5 (1984)
- Age-Rotation Relationship for Late-Type Main-Sequence Stars. *T. N. Rengarajan*. **283**, L63, 97-C14 (1984)
- The Evolution of Asymptotic Giant Branch Stars in the Large Magellanic Cloud. *Neill Reid and Jeremy Mould*. **284**, 98, 99-A14 (1984)
- The Magnetic Fields of the Late-Type Stars. *Ermanno F. Borra, Geoffrey Edward, and M. Mayor*. **284**, 211, 100-D2 (1984)
- Theory of Astrophysical SiO Masers. *S. H. Langer and W. D. Watson*. **284**, 751, 107-C1 (1984)
- Asymmetries in Stellar Mg II h and k and Ca II H and K Line Profiles: Discrepancies Between Mg and Ca Asymmetries. *D. J. Mullan*. **284**, 769, 107-D5 (1984)
- The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. *S. A. Drake, A. Brown, and J. L. Linsky*. **284**, 774, 107-D10 (1984)
- Consequences of a Chromospheric Temperature Gradient on the Width of H α in Late-Type Giants. *D. M. Zarro*. **285**, 232, 112-D11 (1984)
- CO Line Emission from the Expanding Circumstellar Envelopes of Red Giants. *William K. Rose*. **285**, 237, 112-E2 (1984)
- The Ultra-Metal-deficient (Population III?) Red Giant CD -38°245. *M. S. Bessell and John Norris*. **285**, 622, 118-C11 (1984)
- Oxygen Isotopic Abundances in the Atmospheres of Seven Red Giant Stars. *Michael J. Harris and David L. Lambert*. **285**, 674, 118-G7 (1984)
- Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. *W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky*. **285**, 801, 120-C1 (1984)
- Studies of Late-Type Dwarfs. VI. Identification of Population II Main-Sequence Stars at $M_v = +14$. *F. D. A. Hartwick, A. P. Cowley, and J. R. Mould*. **286**, 269, 124-G6 (1984)
- A Search for 183 GHz Emission from Water in Late-Type Stars. *T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodriguez Kuiper, and P. Zimmerman*. **286**, 310, 125-C9 (1984)
- Mass Loss from Red Giants: A Simple Evolutionary Model for NGC 7027. *M. Jura*. **286**, 630, 130-A14 (1984)
- Luminous Late-Type Stars in NGC 205. *Harvey B. Richer, Dennis R. Crabtree, and Christopher J. Pritchett*. **287**, 138, 134-D9 (1984)
- A Search for Cyanogen Variations on the Lower Giant Branch of M3. *John Norris and Graeme H. Smith*. **287**, 255, 135-F5 (1984)
- The Relation between Stellar Rotation Rate and Activity Cycle Periods. *Robert W. Noyes, Nigel O. Weiss, and Arthur H. Vaughan*. **287**, 769, 142-F6 (1984)
- X-Rays from Accretion of Red Giant Winds. *M. Jura and D. J. Helfand*. **287**, 785, 142-G8 (1984)
- Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. *H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith*. **287**, 801, 143-A10 (1984)
- K Giants and the Total Amount of Matter near the Sun. *John N. Bahcall*. **287**, 926, 144-C13 (1984)
- The Temperature of C II Emission-Line Formation Regions in Cool Stars. *Alexander Brown and Kenneth G. Carpenter*. **287**, L43, 138-F1 (1984)
- An Atlas of Late-Type Stellar Spectra, 2400-2778 Inverse Centimeters. *Stephen T. Ridgway, Duane F. Carbon, Donald N. B. Hall, and Jack Jewell*. **54**, 177, 4-A2 (1984) (Abstr. in **276**, 798, 10-B10)
- Ultraviolet and Optical Studies of Binaries with Luminous Cool Primaries and Hot Companions. III. Reticon Radial Velocities: Erratum. *Sidney B. Parsons*. **54**, 372, 6-C10 (1984) (Orig. paper in **53**, 553, 24-E1)
- Yellow Giants in Young Clusters. I. Photometric Observations. *Edward G. Schmidt*. **55**, 455, 17-B8 (1984) (Abstr. in **281**, 891, 72-C4)
- Stars: Long-Period Variables**
- Polarization Properties and Time Variations of the SiO Maser Emission of R Leonis. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson*. **276**, 572, 7-G4 (1984)
- The Three-dimensional Structure of a Circumstellar Maser. *P. F. Bowers and Mark Morris*. **276**, 646, 8-E9 (1984)
- SiS in Circumstellar Shells. *R. Sahai, Alwyn Wootten, and R. E. S. Clegg*. **284**, 144, 99-F2 (1984)
- Luminosities and Mass-Loss Rates of OH/H₂O Maser Stars. *P. F. Bowers and Wendy Hagen*. **285**, 637, 118-E12 (1984)
- A Search for 183 GHz Emission from Water in Late-Type Stars. *T. B. H. Kuiper, P. N. Swanson, D. F. Dickinson, E. N. Rodriguez Kuiper, and P. Zimmerman*. **286**, 310, 125-C9 (1984)
- Shock Waves in Mira Variables. I. Emission-Line Spectra. *M. W. Fox, P. R. Wood, and M. A. Dopita*. **286**, 337, 125-E8 (1984)
- Polarization Properties and Time Variations of the SiO Maser Emission of Omicron Ceti (Mira). *J. S. Miller, F. O. Clark, and T. H. Troland*. **287**, 892, 144-A7 (1984)
- Time Series Infrared Spectroscopy of Mira Variables. II. CO $\delta_v = 3$ in Eight Mira Variables and One SRA Variable. *Kenneth H. Hinkle, Werner W. G. Scharlach, and Donald N. B. Hall*. **56**, 1, 22-A2 (1984) (Abstr. in **283**, 905, 96-F12)
- Stars: Luminosities**
- Spectrophotometry of the White Dwarfs. *Jesse L. Greenstein*. **276**, 602, 8-B6 (1984)
- Effective Temperatures and Luminosities of Very Hot O Type Subdwarfs. *D. Schönberner and J. S. Drilling*. **278**, 702, 33-E9 (1984)
- Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si IV Stellar Wind Effect. *Nolan R. Walborn and Robert J. Panek*. **280**, L27, 54-E3 (1984)
- Implications of the Absolute Magnitude Distribution Functions of DA and Non-DA White Dwarfs. *Edward M. Sion*. **282**, 612, 81-F10 (1984)
- An Investigation of the Stellar Association Containing the 1.95 Day Cepheid SU Cassiopeiae. *David G. Turner and Nancy Remage Evans*. **283**, 254, 88-F13 (1984)
- The Infrared Ca II Triplet: A Luminosity Indicator for Stellar Population Synthesis. *Janet E. Jones, Danielle M. Alloin, and Bernard J. T. Jones*. **283**, 457, 91-A11 (1984)
- Luminosities and Mass-Loss Rates of OH/H₂O Maser Stars. *P. F. Bowers and Wendy Hagen*. **285**, 637, 118-E12 (1984)
- Photometric Parallaxes for Selected Stars of Color Class m from the NLTT Catalog. *Edward W. Weis*. **55**, 289, 15-A3 (1984) (Abstr. in **280**, 940, 60-B4)
- Close Visual Binaries. I. ML Classifications. *Christopher J. Corbally*. **55**, 657, 20-E8 (1984) (Abstr. in **282**, 822, 84-A12)
- Stars: Magnetic**
- Observations of Magnetic Fields on Solar-Type Stars. *Geoffrey W. Marcy*. **276**, 286, 4-A2 (1984)
- Measurements of Zeeman Broadening in F, G, and K Dwarfs. *David F. Gray*. **277**, 640, 19-A13 (1984)
- Polarized Radiation from Hot Plasmas and Applications to AM Herculis Binaries. II. Effect of Collisions and Thomson Scattering. *P. E. Barrett and G. Channugam*. **278**, 298, 27-C2 (1984)
- Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Mag-

Stars: Magnetic—Continued

- netosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. *R. F. Elsner and F. K. Lamb.* **278**, 326, 27-E4 (1984)
- On the Mechanism of Decelerating the Gas Infalling onto Magnetized Neutron Stars. *A. Braun and R. Z. Yeh.* **278**, 349, 27-F13 (1984)
- Brightness Variations Caused by Surface Magnetic Fields in Pre-Main-Sequence Stars. I. *Appenzeller and D. S. P. Dearborn.* **278**, 689, 33-D10 (1984)
- A Note on the Magnetic Field Strengths on the Surfaces of Cool Dwarfs. *D. J. Mullan.* **279**, 746, 46-A5 (1984)
- Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. *R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan.* **279**, 763, 46-B8 (1984)
- Overstable Magnetic Convection and the Rapidly Oscillating Ap Stars. *J. P. Cox.* **280**, 220, 51-D9 (1984)
- Do Bipolar Magnetic Regions Exist on the Surfaces of Early-Type Stars? *Anne B. Underhill and Richard P. Fahey.* **280**, 712, 57-E11 (1984)
- Magnetic Field Observations of Evolved Stars. *Geoffrey W. Marcy and David H. Bruning.* **281**, 286, 64-A12 (1984)
- On Stellar Models with an Isothermal Core in the Presence of a Magnetic Field. *M. K. Das, Jayanta Kar, and J. N. Tandon.* **281**, 292, 64-B4 (1984)
- Electromagnetic Damping of Neutron-Star Oscillations. *P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen.* **281**, 746, 70-F2 (1984)
- Magnetic Buoyancy and the Escape of Magnetic Fields from Stars. *E. N. Parker.* **281**, 839, 71-F2 (1984)
- The Identification of Hydrogen in Grw + 70° 8247. *Jesse L. Greenstein.* **281**, 147, 67-A1 (1984)
- Stellar Fibril Magnetic Systems. I. Reduced Energy State. *E. N. Parker.* **283**, 343, 89-F9 (1984)
- On Some Properties of Force-free Magnetic Fields in Infinite Regions of Space. *J. J. Aly.* **283**, 349, 89-G1 (1984)
- Combined Effect of Potential and Nonpotential Magnetic Fields on Equilibrium in Stellar Atmospheres. *Erast B. Gliner.* **283**, 363, 90-A1 (1984)
- Polarization Angle in Magnetic White Dwarfs. *Brian Martin and D. T. Wickramasinghe.* **283**, 782, 95-D11 (1984)
- On the Bizarre Gamma-Ray Spectrum of SS 433. *H. L. Helfer and M. P. Savedoff.* **283**, L49, 97-B12 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Prado, N. E. White, K. S. Wood, and D. J. Yenit.* **283**, L53, 97-C2 (1984)
- The Magnetic Fields of the Late-Type Stars. *Ermanno F. Borra, Geoffrey Edward, and M. Mayor.* **284**, 211, 100-D2 (1984)
- Linear Polarization of Astronomical Masers and Magnetic Fields. *L. R. Western and W. D. Watson.* **285**, 158, 111-F3 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 - 451 in the High and Low States. *L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips.* **285**, 214, 112-C6 (1984)
- The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. *G. Channugam and A. Ray.* **285**, 252, 112-F3 (1984)
- Magnetorotational Iron Core Collapse. *Eugene M. D. Symbalisty.* **285**, 729, 119-D10 (1984)
- The Magnetic Field of the AM Herculis Object H0139-68. *D. T. Wickramasinghe, N. Visvanathan, and I. R. Tuohy.* **286**, 328, 125-D13 (1984)
- Magnetic Fields in the Radiative Interior of Stars. I. Thermal Shadows and Forced Convection. *E. N. Parker.* **286**, 666, 130-D8 (1984)
- Magnetic Fields in the Radiative Interior of Stars. II. Forced Convection and the ^7Li Abundance. *E. N. Parker.* **286**, 677, 130-E5 (1984)
- The Appearance of Magnetic Flux on the Surfaces of the Early Main-Sequence F Stars. *Mark S. Giampapa and Robert Rosner.* **286**, L19, 126-E7 (1984)
- Similar Photospheres, Different Mantles: A Study of Four O Stars. *Anne B. Underhill.* **287**, 874, 143-G3 (1984)
- Stars: Massive**
- Cosmological Consequences of Population III Stars. *B. J. Carr, J. R. Bond, and W. D. Arnett.* **277**, 445, 17-A5 (1984)
- On the Composition of the Stellar Winds of the Most Massive Stars: 100 M_{\odot} to 2200 M_{\odot} . *D. S. P. Dearborn and J. B. Blake.* **277**, 783, 20-F3 (1984)
- IRAS Observations of Two Early-Type Pre-Main-Sequence Stars in the Association Chamaeleon I. *P. R. Wesselius, D. A. Beintema, and F. M. Olmon.* **278**, L37, 29-E10 (1984)
- Duplicity of the "Supermassive" Object R136a. *Charles E. Worley.* **278**, L109, 36-B12 (1984)
- The Formation of Massive Stars along the W5 Ionization Front. *B. A. Wilking, P. M. Harvey, C. J. Lada, M. Joy, and C. R. Doering.* **279**, 291, 40-B12 (1984)
- Rapid Expansion of Polytropes. *Aaron Barnes and Alan Paul Boss.* **280**, 819, 58-F13 (1984)
- The Evolution and Fate of Very Massive Objects. *J. R. Bond, W. D. Arnett, and B. J. Carr.* **280**, 825, 58-G5 (1984)
- The Initial Mass Function for Massive Stars in the Galaxy and the Magellanic Clouds. *Roberta M. Humphreys and Douglas B. McElroy.* **284**, 565, 105-C6 (1984)
- Infrared Observations of the Eclipse of Epsilon Aurigae: Direct Measurement of the 500 K Secondary at 5, 10, and 20 Microns. *D. E. Backman, E. E. Becklin, D. P. Cruikshank, R. R. Joyce, Theodore Simon, and A. Tokunaga.* **284**, 799, 107-F8 (1984)
- Explosive Nucleosynthesis in Massive Stars: Comparison with the Cassiopeia A Fast-moving Knots. *M. D. Johnston and A. Yeh.* **285**, 587, 118-A4 (1984)
- Time Variations of the H α Line Profile from the Core of Eta Carinae. *Maria Teresa Ruiz, Jorge Melnick, and Patricio Ortiz.* **285**, L19, 114-G5 (1984)
- Supermassive Monopole Stars. *J. N. Fry and George M. Fuller.* **286**, 397, 127-D5 (1984)
- Stars: Mass Loss**
- A High-Resolution Study of Herbig-Haro Objects 1 and 2. *L. Hartmann and J. C. Raymond.* **276**, 560, 7-F4 (1984)
- Radio Emission from the Outer Parts of Stellar Atmospheres (Mantles) at Centimeter Wavelengths and the Winds of Early-Type Stars. *Anne B. Underhill.* **276**, 583, 8-A1 (1984)
- Interactions between Pre-Main-Sequence Objects and Molecular Clouds. II. PV Cephei. *Russell M. Leveault.* **277**, 634, 19-A6 (1984)
- IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Oroico, T. R. Gull, and P. Benvenuti.* **278**, 124, 25-D2 (1984)
- Observations and Analysis of Circumstellar Cyanoacetylene. *P. R. Jewell and L. E. Snyder.* **278**, 176, 26-A1 (1984)
- Departures from Thermal Equilibrium in Expanding Stars. *Charles A. Whitney.* **278**, 310, 27-D2 (1984)
- 2 to 20 Micron Observations of Mass Loss from Early-Type Stars. *David C. Abbott, C. M. Telesco, and Sidney C. Wolff.* **279**, 225, 39-D14 (1984)
- The Morphology of a Mass Loss Episode of the Be Star ω Orionis. *Daniel P. Hayes and Edward F. Guinan.* **279**, 721, 45-F8 (1984)
- The Dust around R Coronae Borealis Type Stars. *J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu.* **280**, 228, 51-E3 (1984)
- Mass Loss in T Tauri Stars: Observational Studies of the Cool Parts of Their Stellar Winds and Expanding Shells. *Reinhard Mundt.* **280**, 749, 58-A9 (1984)
- Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. *Peter Bodenheimer and Ronald E. Taam.* **280**, 771, 58-C7 (1984)
- Energy Balance of Stellar Coronae. III. Effect of Stellar Mass and Radius. *Reiner Hammer.* **280**, 780, 58-D3 (1984)
- The T Tauri Radio Source. *P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell.* **280**, L23, 54-D13 (1984)
- Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. *R. Brent Tully and S. C. Wolff.* **281**, 67, 61-F3 (1984)
- A Survey of High-Velocity Molecular Gas near Herbig-Haro Objects. II. *Suzan Edwards and Ronald L. Snell.* **281**, 237, 63-D13 (1984)
- Chromospheres and Mass Loss in Metal-deficient Giant Stars. *A. K. Dupree, L. Hartmann, and E. H. Avrett.* **281**, L37, 66-G7 (1984)
- Multiple Circumstellar Shells and Radiation Pressure on Grains in the Outflow from Late-Type Stars. *M. Jura.* **282**, 200, 76-B4 (1984)
- Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. *Jorge Cantó, Luis F. Rodriguez, Nuria Calvet, and Russell M. Leveault.* **282**, 631, 82-A1 (1984)
- VLA Observations of T Tauri Stars. II. A Luminosity-limited Survey of Taurus-Auriga. *J. H. Bieging, Martin Cohen, and P. R. Schwartz.* **282**, 699, 82-F4 (1984)
- The Evolution of Asymptotic Giant Branch Stars in the Large Magellanic Cloud. *Neill Reid and Jeremy Mould.* **284**, 98, 99-A14 (1984)
- On the Extended Chromosphere of a Orionis. *L. Hartmann and E. H. Avrett.* **284**, 238, 100-F1 (1984)
- Optically Thick Ablation Fronts. *Arieh Königl.* **284**, 303, 101-C10 (1984)
- Mass Loss in O-Type Stars: Parameters Which Affect It. *C. D. Garmany and P. S. Conti.* **284**, 705, 106-F8 (1984)
- CO Line Emission from the Expanding Circumstellar Envelopes of Red Giants. *William K. Rose.* **285**, 237, 112-E2 (1984)
- Luminosities and Mass-Loss Rates of OH/H $_2$ O Maser Stars. *P. F. Bowers and Wendy Hagen.* **285**, 637, 118-E12 (1984)
- The Distribution of HCN in the Circumstellar Envelope of IRC +10216. *J. H. Bieging, B. Chapman, and W. J. Welch.* **285**, 656,

- 118-F3 (1984)
Radio Emission from a Type I Supernova: SN 1983.51 in NGC 5236. *R. A. Sramek, N. Panagia, and K. W. Weiler*. **285**, L59, 121-E2 (1984)
Thermal and Maser Molecular Lines from the Envelope of IRC + 10216. *Nguyen-Q-Rieu, V. Bujarrabal, H. Olofsson, L. E. B. Johansson, and B. E. Turner*. **286**, 276, 125-A1 (1984)
Bipolar Outflows in Dark Clouds. *Paul F. Goldsmith, Ronald L. Snell, Mark Hemeon-Heyer, and William D. Langer*. **286**, 599, 129-F7 (1984)
Mass Loss from Red Giants: A Simple Evolutionary Model for NGC 7027. *M. Jura*. **286**, 630, 130-A14 (1984)
Near-Infrared Speckle Interferometry of Evolved Stars and Bipolar Nebulae. *H. M. Dyck, B. Zuckerman, Ch. Leinert, and S. Beckwith*. **287**, 801, 143-A10 (1984)
The Abrupt Onset of a Major ω Orionis Mass Loss Episode. *Edward F. Guinan and Daniel P. Hayes*. **287**, L39, 138-E11 (1984)
The Evolution of Cataclysmic and Low-Mass X-Ray Binaries. *Joseph Patterson*. **54**, 443, 8-A8 (1984) (Abstr. in **278**, 894, 35-E12)
- Stars: Metallic-Line**
The Nature of the Visual Companions of Ap and Am Stars. *Helmut A. Abt and Octavio Cardona*. **276**, 266, 3-F10 (1984)
Effective Temperatures and Surface Gravities of Metallic-Line A Stars. *M. C. Lane and John B. Lester*. **281**, 723, 70-D7 (1984)
Spectroscopic Tests of Photoelectric Stellar Classification of Abnormal Stars. *Helmut A. Abt*. **285**, 247, 112-E2 (1984)
- Stars: Neutron**
Vortex Creep and the Internal Temperature of Neutron Stars. I. General Theory. *M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham*. **276**, 325, 4-C13 (1984)
An Identification for "Gemina" (2CG 195 + 04): The Optical Counterpart of 1E 0630 + 178, A Unique Object in the Gamma-Ray Source Error Box. *Patrizia A. Caraveo, Giovanni F. Bignami, Laurent Vignoux, and Jacques A. Paul*. **276**, L45, 10-F2 (1984)
Precursors to X-Ray Bursts: The Result of Expansion and Subsequent Contraction of the Neutron Star's Photosphere. *Walter H. G. Lewin, William D. Vacca, and Ewa M. Basinska*. **277**, L57, 22-F8 (1984)
Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Magnetosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. *R. F. Elsner and F. K. Lamb*. **278**, 326, 27-E4 (1984)
Gravitational Radiation from Accreting Neutron Stars. *Robert V. Wagoner*. **278**, 345, 27-F9 (1984)
On the Mechanism of Decelerating the Gas Infalling onto Magnetized Neutron Stars. *A. Braun and R. Z. Yahel*. **278**, 349, 27-F13 (1984)
Limits on the Gravitational Redshift from Neutron Stars. *Lee Lindblom*. **278**, 364, 28-A1 (1984)
Self-consistent Models for Coulomb-heated X-Ray Pulsar Atmospheres. *A. K. Harding, P. Mészáros, J. G. Kirk, and D. J. Galloway*. **278**, 369, 28-A6 (1984)
Vortex Creep and the Internal Temperature of Neutron Stars. II. Vela Pulsar. *M. A. Alpar, P. W. Anderson, D. Pines, and J. Shaham*. **278**, 791, 34-E5 (1984)
Neutrino Emissivity of Interacting Quark Matter in Neutron Stars. II. Finite Neutrino Momentum Effects. *Robert C. Duncan, Stuart L. Shapiro, and Ira Wasserman*. **278**, 806, 34-F6 (1984)
Thermal Evolution of Accreting Neutron Stars. *Masayuki Y. Fujimoto, Tomoyuki Hanawa, Icko Iben, Jr., and M. B. Richardson*. **278**, 813, 34-F13 (1984)
Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. *Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama*. **279**, 413, 41-D10 (1984)
Hydraulic Jumps in "Viscous" Accretion Disks. *F. Curtis Michel*. **279**, 807, 46-E11 (1984)
Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **280**, 259, 51-G6 (1984)
Double-Core Evolution. II. Two-dimensional Hydrodynamic Effects. *Peter Bodenheimer and Ronald E. Taam*. **280**, 771, 58-C7 (1984)
Neutrino-Pair Bremsstrahlung in Dense Stars. III. Low-Temperature Quantum Corrections in the Liquid Metal Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **280**, 787, 58-D9 (1984)
Electromagnetic Damping of Neutron Star Oscillations. *P. N. McDermott, M. P. Savedoff, H. M. Van Horn, E. G. Zweibel, and C. J. Hansen*. **281**, 746, 70-F2 (1984)
On the Emission of Gravitational Radiation from Inhomogeneous Jacobi Configurations. *James R. Ipser and Robert A. Managan*. **282**, 287, 77-A8 (1984)
Rapid Postglitch Spin-up of the Superfluid Core in Pulsars. *M. A. Alpar, Stephen A. Langer, and J. A. Sauls*. **282**, 533, 81-A1 (1984)
Rotating Neutron Star Structure: Implications of the Millisecond Pulsar PSR 1937 + 214. *A. Ray and B. Datta*. **282**, 542, 81-A10 (1984)
Cygnus X-2: Neutron Star or Degenerate Dwarf? *J. E. McClintock, L. D. Petro, G. Hammerschlag-Hensberge, C. R. Proffitt, and R. A. Remillard*. **283**, 794, 95-E9 (1984)
Resonant Absorption, Hot Electrons, and Cosmic Gamma-Ray Bursts. *E. P. Liang*. **283**, L21, 91-F9 (1984)
New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pralgo, N. E. White, K. S. Wood, and D. J. Yentis*. **283**, L53, 97-C2 (1984)
Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 304, 113-C2 (1984)
The Collapse of Rotating Stellar Cores: Equilibria between White Dwarf and Neutron Star Densities. *Joel E. Tohline*. **285**, 721, 119-D2 (1984)
Electrical and Thermal Conductivities of Dense Matter in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki*. **285**, 758, 119-F12 (1984)
Lateral Propagation of the Helium Shell Flash on an Accreting Neutron Star. *Toshiya Nozakura, Satoru Ikeuchi, and Masayuki Y. Fujimoto*. **286**, 221, 124-C13 (1984)
Limits from the Soft X-Ray Background on the Temperature of Old Neutron Stars and on the Flux of Superheavy Magnetic Monopoles. *Edward W. Kolb and Michael S. Turner*. **286**, 702, 130-G2 (1984)
Analytical Models of Neutron Star Envelopes. *Lars Hernquist and James H. Applegate*. **287**, 244, 135-E8 (1984)
Gravitational Radiation from Colliding Compact Stars: Hydrodynamical Calculations in Two Dimensions. *David L. Gilden and Stuart L. Shapiro*. **287**, 728, 142-C5 (1984)
The Evolution of the Inner Regions of Viscous Accretion Disks Surrounding Neutron Stars. *Ronald E. Taam and D. N. C. Lin*. **287**, 761, 142-E12 (1984)
The Spectra of X-Ray Bursting Neutron Stars. *Richard A. London, Ronald E. Taam, and W. Michael Howard*. **287**, L27, 138-D14 (1984)
Relativistic Electron Transport in a Quantizing Magnetic Field. *Lars Hernquist*. **56**, 325, 27-C7 (1984) (Abstr. in **285**, 875, 121-A6)
- Stars: Novae**
Boundary Layers in Cataclysmic Variables: The HEAO 1 X-Ray Constraints. *Kenneth A. Jensen*. **278**, 278, 27-A10 (1984)
²⁶Al in the Interstellar Medium. *Donald D. Clayton*. **280**, 144, 50-E8 (1984)
IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. *G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovák, P. M. Gondhalekar, and J. W. Truran*. **281**, 194, 63-A12 (1984)
The Mysterious 10 Micron Emission Feature in the Spectrum of Nova Aquilae 1982. *Robert D. Gehrz, Edward P. Ney, Gary L. Grasdale, John A. Hackwell, and Harley A. Thomson, Jr.*. **281**, 303, 64-C1 (1984)
The Effect of Diffusion on Pre-nova Evolution: CNO-enriched Envelopes. *Dina Priadnik and Attay Kovetz*. **281**, 367, 65-A1 (1984)
A New Type of Extended Nonthermal Radio Emitter: Detection of the Old Nova GK Persei. *Stephen P. Reynolds and Roger A. Chevalier*. **281**, L33, 66-G4 (1984)
WY Sagittae (Nova 1783): A Transition Object between Classical and Dwarf Novae? *M. M. Shara, A. F. J. Moffat, J. T. McGraw, D. S. Dearborn, H. E. Bond, E. Kemper, and R. Lamontagne*. **282**, 763, 83-D4 (1984)
X-Ray Emission from Symbiotic Novae. *Sun Kwok and D. A. Leahy*. **283**, 675, 94-C11 (1984)
HEAO 1 High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). *B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primini, and W. H. G. Lewin*. **285**, 258, 112-F9 (1984)
The Detection of X-Rays from Nova Muscae 1983 with the EXOSAT Satellite. *H. Ögelman, K. Beuermann, and J. Krautter*. **287**, L31, 138-E4 (1984)
- Stars: Of-Type**
Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si iv Stellar Wind Effect. *Nolan R. Walborn and Robert J. Panek*. **280**, L27, 54-E3 (1984)
Recombination Stellar Wind Model for the Coronae of Early-Type Stars. *Wayne L. Waldron*. **282**, 256, 75-F4 (1984)
- Stars: Peculiar A**
The Nature of the Visual Companions of Ap and Am Stars. *Helmut A. Abt and Octavio Cardona*. **276**, 266, 3-F10 (1984)
Asymmetries in the Spectral Lines of Procyon and κ Cancri. *John B. Rice and William H. Wehlau*. **278**, 721, 33-G1 (1984)

- Broad-Band Photometry of Extreme Helium Stars. *J. S. Drilling, A. U. Landolt, and D. Schönberner*. **279**, 748, 46-A7 (1984)
- Overstable Magnetic Convection and the Rapidly Oscillating Ap Stars. *J. P. Cox*. **280**, 220, 51-D9 (1984)
- Spectroscopic Tests of Photoelectric Stellar Classification of Abnormal Stars. *Helmut A. Abt*. **285**, 247, 112-E12 (1984)
- The Resonance Lines of Hg II in IUE Spectra of Chemically Peculiar Stars. *David S. Leckrone*. **286**, 725, 131-A14 (1984)
- An Analysis by Wavelength Coincidence Statistics of the Ultraviolet Spectrum of Kappa Cancri. *George T. Chionacki, Charles R. Cowley, and Donald J. Bord*. **286**, 736, 131-B11 (1984)
- The A0 Stars. *Olin J. Eggen*. **55**, 597, 20-A1 (1984) (Abstr. in **282**, 821, 84-A11)
- The A0 Stars: Erratum. *Olin J. Eggen*. **56**, 650, 33-C3 (1984) (Orig. paper in **55**, 597, 20-A1)
- Stars: Population II**
- HD 46703: A High-Luminosity Population II F-Type Star. *R. Earle Luck and Howard E. Bond*. **279**, 729, 45-G2 (1984)
- AB Stars in the Southern Galactic Halo. III. Kinematics of the Halo. *Jeffrey R. Pier*. **281**, 260, 63-F8 (1984)
- Velocity Dispersions of Disk Stars in Spiral Galaxies. *John N. Bahcall and Stefano Casertano*. **284**, L35, 109-B5 (1984)
- The Ultra-Metal-deficient (Population III?) Red Giant CD -38° 245. *M. S. Bessell and John Norris*. **285**, 622, 118-C11 (1984)
- Studies of Late-Type Dwarfs. VI. Identification of Population II Main-Sequence Stars at $M_V = +14$. *F. D. A. Hartwick, A. P. Cowley, and J. R. Mould*. **286**, 269, 124-G6 (1984)
- On the Evolution of an Intermediate-Mass Zero-Metal Star Which Does Not Experience Thermal Instabilities during the Double Shell Burning Phase. *Alessandro Chieffi and Amedeo Tornambè*. **287**, 745, 142-D10 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. *Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè*. **287**, 749, 142-D14 (1984)
- A Medium-Bright Quasar Sample: New Quasar Surface Densities in the Magnitude Range $16.4 < B < 17.65$. *Kenneth J. Mitchell, Archibald Warnock III, and Peter D. Usher*. **287**, L3, 138-C5 (1984)
- Stars: Pre-Main-Sequence**
- 4.6 Micron Absorption Features due to Solid Phase CO and Cyano Group Molecules toward Compact Infrared Sources. *J. H. Lucy, F. Baas, L. J. Allamandola, S. E. Persson, P. J. McGregor, Carol J. Lonsdale, T. R. Geballe, and C. E. P. van de Bult*. **276**, 533, 7-D4 (1984)
- A High-Resolution Study of Herbig-Haro Objects 1 and 2. *L. Hartmann and J. C. Raymond*. **276**, 560, 7-F4 (1984)
- The Ultraviolet Spectrum of a Strongly Reddened, High-Excitation Herbig-Haro Object. *K. H. Böhm and E. Böhm-Vitense*. **277**, 216, 13-C8 (1984)
- Interactions between Pre-Main-Sequence Objects and Molecular Clouds. II. PV Cephei. *Russell M. Leavitt*. **277**, 634, 19-A6 (1984)
- The Chromospheric Hypothesis for the T Tauri Phenomenon. *Nuria Calvet, Gibor Basri, and Leonard V. Kuhi*. **277**, 725, 20-A11 (1984)
- Far-Infrared and Submillimeter Observations of the Low-Luminosity Protostars L1455 FIR and L1551 IRS 5: The Confinement of Bipolar Outflows. *J. A. Davidson and D. T. Jaffe*. **277**, L13, 16-A13 (1984)
- Hydrodynamic Ejection of Bipolar Flows from Objects Undergoing Disk Accretion: T Tauri Stars, Massive Pre-Main-Sequence Objects, and Cataclysmic Variables. *Michael V. Torbett*. **278**, 318, 27-D10 (1984)
- Far-Infrared Studies of Herbig-Haro Objects and Their Exciting Stars. *Martin Cohen, Paul M. Harvey, Richard D. Schwartz, and Bruce A. Wilking*. **278**, 671, 33-C6 (1984)
- Brightness Variations Caused by Surface Magnetic Fields in Pre-Main-Sequence Stars. I. *Appenzeller and D. S. P. Dearborn*. **278**, 689, 33-D10 (1984)
- High-Sensitivity IRAS Observations of the Chamaeleon I Dark Cloud. *B. Baud, E. Young, C. A. Beichman, D. A. Beintema, J. P. Emerson, H. J. Habing, S. Harris, R. E. Jennings, P. L. Marsden, and P. R. Wesselius*. **278**, L53, 29-F12 (1984)
- On the Formation of Stars from Disk Accretion. *J. A. Mercer-Smith, A. G. W. Cameron, and R. I. Epstein*. **279**, 363, 41-A2 (1984)
- Far-Infrared Observations of a Star-Forming Region in the Corona Australis Dark Cloud. *Irene Cruz-Gonzalez, B. McBreen, and G. G. Fazio*. **279**, 679, 45-C6 (1984)
- Dense Cores in Dark Clouds: Young Embedded Stars at 2 Micrometers. *P. J. Benson, P. C. Myers, and E. L. Wright*. **279**, L27, 42-E13 (1984)
- Mass Loss in T Tauri Stars: Observational Studies of the Cool Parts of Their Stellar Winds and Expanding Shells. *Reinhard Mundt*. **280**, 749, 58-A9 (1984)
- The T Tauri Radio Source. *P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell*. **280**, L23, 54-D13 (1984)
- Far-Infrared Selected Star Formation Regions. D. T. Jaffe, R. H. Hildebrand, Jocelyn Keene, D. A. Harper, R. F. Loewenstein, and J. M. Moran. **281**, 225, 63-D1 (1984)
- A Survey of High-Velocity Molecular Gas near Herbig-Haro Objects. II. *Suzan Edwards and Ronald L. Snell*. **281**, 237, 63-D13 (1984)
- Far-Infrared Observations of Southern Herbig-Haro Objects. *Martin Cohen, Richard D. Schwartz, Paul M. Harvey, and Bruce A. Wilking*. **281**, 250, 63-E12 (1984)
- Photometric Study of NGC 2023 in the 3500 Å to 10000 Å Region: Confirmation of a Near-IR Emission Process in Reflection Nebulae. *Adolf N. Witt, Rudolph E. Schild, and James B. Kraiman*. **281**, 708, 70-C3 (1984)
- Magnetic Field Structure in the Taurus Dark Cloud. *Andrea Moneti, Judith L. Pipher, H. L. Helfer, Robert S. McMillan, and Marcus L. Perry*. **282**, 508, 80-F4 (1984)
- Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. *Jorge Cantó, Luis F. Rodríguez, Nuria Calvet, and Russell M. Leavitt*. **282**, 631, 82-A1 (1984)
- A Paradoxical Gap in the Relative Ages of T Tauri Stars. *Wm. Bruce Weaver*. **282**, 688, 82-E6 (1984)
- VLA Observations of T Tauri Stars. II. A Luminosity-limited Survey of Taurus-Auriga. *J. H. Bieging, Martin Cohen, and P. R. Schwartz*. **282**, 699, 82-F4 (1984)
- Observations of Diffuse Interstellar Bands toward T Tauri Stars. *David M. Meyer and Roger K. Ulrich*. **283**, 98, 87-B5 (1984)
- Velocity-resolved Infrared Spectroscopy of LkHa 101. *M. Simon and L. Cassar*. **283**, 179, 88-A7 (1984)
- High Spatial Resolution IR Observations of Young Stellar Objects: A Possible Disk Surrounding HL Tauri. *Gary L. Grasdalen, Stephen E. Strom, Karen M. Strom, R. W. Capps, DeAnne Thompson, and Michael Castelaz*. **283**, L57, 97-C6 (1984)
- High-Velocity Molecular Jets. *Ronald L. Snell, N. Z. Scoville, D. B. Sanders, and Neal R. Erickson*. **284**, 176, 100-A8 (1984)
- X-Ray Photometry and Spectroscopy of T Tauri Stars. *F. M. Walter and L. V. Kuhi*. **284**, 194, 100-B12 (1984)
- The Reflection Nebula NGC 1999. *Jason A. Cardelli and K. H. Böhm*. **285**, 613, 118-C2 (1984)
- Narrow-Band Imaging and Velocity Maps of Young Stellar Objects: Initial Results. *J. S. Morgan, S. C. Wolff, S. E. Strom, and K. M. Strom*. **285**, L71, 121-E14 (1984)
- Brackett-Alpha Line Profiles of Young Stellar Objects. *S. E. Persson, T. R. Geballe, Peter J. McGregor, Suzan Edwards, and Carol J. Lonsdale*. **286**, 289, 125-A14 (1984)
- The Nature of AFGL 2591 and Its Associated Molecular Outflow: Infrared and Millimeter-Wave Observations. *Charles J. Lada, Harley A. Thronson, Jr., Howard A. Smith, P. R. Schwartz, and W. Glaccum*. **286**, 302, 125-C1 (1984)
- Absorption Features in the 5-8 Micron Spectra of Protostars. *A. G. G. M. Tielens, L. J. Allamandola, J. Bregman, J. Goebel, L. d'Hendecourt, and F. C. Witteborn*. **287**, 697, 142-A1 (1984)
- Discovery of Solar System-Size Halos around Young Stars. *S. Beckwith, B. Zuckerman, M. F. Skrutskie, and H. M. Dyck*. **287**, 793, 143-A2 (1984)
- The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. *Erika Böhm-Vitense, Paul Hodge, and Don Boggs*. **287**, 825, 143-C7 (1984)
- A Deep Photometric Study of IC 5146. *Juan C. Forte and Ana M. Orsatti*. **56**, 211, 25-B13 (1984) (Abstr. in **284**, 869, 108-E1)
- Stars: Proper-Motion**
- New Spectrophotometry of the Extremely Cool Proper Motion Star LHS 2924. *James Liebert, Todd A. Boroson, and Mark S. Giampapa*. **282**, 758, 83-C13 (1984)
- Photometric Parallaxes for Selected Stars of Color Class *m* from the NLTT Catalog. *Edward W. Weis*. **55**, 289, 15-A3 (1984) (Abstr. in **280**, 940, 60-B4)
- Stars: Pulsation**
- Long-Period Classical Cepheids: Theory versus Observation. *T. Richard Carson and Richard B. Stothers*. **276**, 593, 8-A11 (1984)
- Normal Modes of Oscillation for Rotating Stars. II. Variational Solutions. *Maurice J. Clement*. **276**, 724, 9-D6 (1984)
- The Pulsating Central Star of the Planetary Nebula Kohoutek 1-16. *Albert D. Grauer and Howard E. Bond*. **277**, 211, 13-C3 (1984)
- Observations of Quasi-periodic Oscillations in the Light Curve of VW Hydr. *Edward L. Robinson and Brian Warner*. **277**, 250, 13-E14 (1984)
- Convection in Pulsating Stars. III. The RR Lyrae Instability Strip. *R. F. Stellingwerf*. **277**, 322, 14-D7 (1984)
- Convection in Pulsating Stars. IV. Nonlinear Effects. *R. F. Stellingwerf*. **277**, 327, 14-D12 (1984)

- Resonant Three-Wave Interactions of Solar g -Modes. *D. B. Guenther and P. Demarque*. **277**, L17, 16-B3 (1984)
- The Baade-Wesselink Method and the Distances to RR Lyrae Stars. I. The Field Star VY Serpentis. *Bruce W. Carney and David W. Latham*. **278**, 241, 26-E11 (1984)
- Departures from Thermal Equilibrium in Expanding Stars. *Charles A. Whitney*. **278**, 310, 27-D2 (1984)
- Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. *F. A. Córdova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire*. **278**, 739, 34-A9 (1984)
- The ZZ Ceti Star GD 385 Revisited. *S. O. Kepler*. **278**, 754, 34-B10 (1984)
- Amplitude Equations for Nonadiabatic Nonlinear Stellar Pulsators. I. The Formalism. *J. Robert Buchler and Marie-Jo Goupil*. **279**, 384, 41-C5 (1984)
- Two New Extremely Hot Pulsating White Dwarfs. *Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert*. **279**, 751, 46-A10 (1984)
- PG 1654 + 160: A New Pulsating DB White Dwarf. *D. E. Winget, E. L. Robinson, R. E. Nather, and Suchitra Balachandran*. **279**, L15, 42-E2 (1984)
- Overstable Magnetic Convection and the Rapidly Oscillating Ap Stars. *J. P. Cox*. **280**, 220, 51-D9 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. *F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato, Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibasaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo*. **280**, 259, 51-G6 (1984)
- Very Nonadiabatic Radial Pulsations in Luminous Helium Stars. *Hideyuki Saio, J. Craig Wheeler, and John P. Cox*. **281**, 318, 64-D4 (1984)
- Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. *Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenlid*. **281**, 766, 70-G8 (1984)
- Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. *Sumner Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell*. **281**, 800, 71-C4 (1984)
- Very Slow Classical Cepheids: Theoretical Models with Periods Longer than 50 Days. *T. Richard Carson and Richard B. Stothers*. **281**, 811, 71-D1 (1984)
- Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. *Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry*. **282**, 226, 76-D2 (1984)
- Stellar Acoustics. II. Pulse Resonance in Giant Star Models. *Toshiki Aikawa and Charles A. Whitney*. **282**, 527, 80-G9 (1984)
- Diffusion in a Thermally Pulsating Star. *Attay Kovets, Dina Prialnik, and Giora Shaviv*. **282**, 584, 81-D10 (1984)
- Surface Brightness Radii, Distances, and Absolute Magnitudes of Classical Cepheids. *Wolfgang Gieren*. **282**, 650, 82-B8 (1984)
- An Investigation of the Stellar Association Containing the 1.95 Day Cepheid SU Cassiopeiae. *David G. Turner and Nancy Remage Evans*. **283**, 254, 88-F13 (1984)
- Is the Metal Contribution to the Astrophysical Opacity Incorrect? *N. H. Magee, Jr., A. L. Merts, and W. F. Huebner*. **283**, 264, 88-G10 (1984)
- Critique of the Iterative Theory of Stellar Pulsations. *J. Robert Buchler and W. Dean Pesnell*. **283**, 316, 89-D10 (1984)
- Observations and a New Interpretation for the Delta Scuti Variable Star VZ Cancri. *Arthur N. Cox, Bernard J. McNamara, and William Ryan*. **284**, 250, 100-F13 (1984)
- Phase Lags and Pulsation Modes of Classical Cepheids. *Norman R. Simon*. **284**, 278, 101-A13 (1984)
- Self-consistent Radiation-hydrodynamic Equations for Stellar Oscillations. I. Nonlinear Form. *Barbara Weibel Mihalas*. **284**, 299, 101-C6 (1984)
- Convection in Pulsating Stars. V. Limit Cycle Characteristics. *R. F. Stellingwerf*. **284**, 712, 106-G1 (1984)
- The Luminosity Scale of Cepheid Variable Stars: A Revision. *Edward G. Schmidt*. **285**, 501, 117-A4 (1984)
- Thermal Response of Stellar Envelopes during Nonradial Pulsations. *W. Dean Pesnell*. **285**, 778, 120-A4 (1984)
- Light and Line Profile Variations due to r -Mode Pulsations with an Application to the ZZ Ceti Star G117-B15A. *S. O. Kepler*. **286**, 314, 125-C13 (1984)
- Shock Waves in Mira Variables. I. Emission-Line Spectra. *M. W. Fox, P. R. Wood, and M. A. Dopita*. **286**, 337, 125-E8 (1984)
- On the Overstability of Axisymmetric Oscillations in Thin Accretion Disks. *G. R. Blumenthal, L. T. Yang, and D. N. C. Lin*. **287**, 774, 142-F11 (1984)
- Observational Studies of Cepheids. II. *BVRI* Photometry of 112 Cepheids. *Thomas J. Moffett and Thomas G. Barnes III*. **55**, 389, 16-B10 (1984) (Abstr. in **281**, 890, 72-C3)
- Time Series Infrared Spectroscopy of Mira Variables. II. CO $\delta_v = 3$ in Eight Mira Variables and One SRa Variable. *Kenneth H. Hinkle, Werner W. G. Scharlach, and Donald N. B. Hall*. **56**, 1, 22-A2 (1984) (Abstr. in **283**, 905, 96-F12)
- Stars: Radio Radiation**
- Radio Emission from the Outer Parts of Stellar Atmospheres (Mantles) at Centimeter Wavelengths and the Winds of Early-Type Stars. *Anne B. Underhill*. **276**, 583, 8-A1 (1984)
- VLBI Observations of the RS Canum Venaticorum Binary Systems UX Arietis and HR 1099 at 1.65 GHz. *R. L. Mutel, D. J. Doiron, J. F. Lestrade, and R. B. Phillips*. **278**, 220, 26-D4 (1984)
- Radio Observations of W Ursae Majoris Stars. *V. A. Hughes and B. J. McLean*. **278**, 716, 33-F10 (1984)
- Very Long Baseline Interferometry Observations of the RS Canum Venaticorum System HR 5110 at 8.4 GHz. *Jean-François Lestrade, Robert L. Mutel, Robert A. Preston, John A. Scheid, and Robert B. Phillips*. **279**, 184, 39-A8 (1984)
- The Radio Structure of HM Sagittae. *Sun Kwok, R. C. Bignell, and C. R. Purton*. **279**, 188, 39-A12 (1984)
- The Detection of Variable, Nonthermal Radio Emission from Two O Type Stars. *David C. Abbott, J. H. Bieging, and E. Churchwell*. **280**, 671, 57-B10 (1984)
- The T Tauri Radio Source. *P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell*. **280**, L23, 54-D13 (1984)
- VLA Observations of T Tauri Stars. II. A Luminosity-limited Survey of Taurus-Auriga. *J. H. Bieging, Martin Cohen, and P. R. Schwartz*. **282**, 699, 82-F4 (1984)
- Detection of a Sub-Millarcsecond Radio Component in the RS CVn System 1099. *Jean-François Lestrade, Robert L. Mutel, Robert B. Phillips, John C. Webber, Arthur E. Niell, and Robert A. Preston*. **282**, L23, 78-B12 (1984)
- Two-Frequency Radio Spectra during the Outburst of the Periodic Radio Star LSI +61°303. *A. R. Taylor and P. C. Gregory*. **283**, 273, 89-A6 (1984)
- A Radio Survey of Symbiotic Stars. *E. R. Seaquist, A. R. Taylor, and S. Botton*. **284**, 202, 100-C7 (1984)
- The Circumstellar Interaction Model for the Radio Emission from a Type I Supernova. *Roger A. Chevalier*. **285**, L63, 121-E6 (1984)
- Radio Emission from Symbiotic Stars: A Binary Model. *A. R. Taylor and E. R. Seaquist*. **286**, 263, 124-F14 (1984)
- Stars: R Coronae Borealis**
- Double White Dwarfs as Progenitors of R Coronae Borealis Stars and Type I Supernovae. *R. F. Webbink*. **277**, 355, 14-F12 (1984)
- The Spectrum of V348 Sagittarii. *Oved Dahari and Donald E. Osterbrock*. **277**, 648, 14-B7 (1984)
- The Dust around R Coronae Borealis Type Stars. *J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu*. **280**, 228, 51-E3 (1984)
- Very Nonadiabatic Radial Pulsations in Luminous Helium Stars. *Hideyuki Saio, J. Craig Wheeler, and John P. Cox*. **281**, 318, 64-D4 (1984)
- Stars: Rotation**
- Is Stellar Differential Rotation Observable? *Barry LaBonte*. **276**, 335, 4-D9 (1984)
- Some Effects of Rotation on the Structure and Dynamics of a Radiation-driven Wind from a Hot Star. *J. M. Marlborough and M. Zamir*. **276**, 706, 9-C2 (1984)
- Normal Modes of Oscillation for Rotating Stars. II. Variational Solutions. *Maurice J. Clement*. **276**, 724, 9-D6 (1984)
- Rotational Modulation of the Chromospheric Activity in χ^1 Orionis (G0 V). *Ann Merchant Boesgaard and Theodore Simon*. **277**, 241, 13-E5 (1984)
- Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. *Monique Tassoul and Jean-Louis Tassoul*. **279**, 384, 41-E9 (1984)
- Rotation, Convection, and Magnetic Activity in Lower Main-Sequence Stars. *R. W. Noyes, L. W. Hartmann, S. L. Baliunas, D. K. Duncan, and A. H. Vaughan*. **279**, 763, 46-B8 (1984)
- A Study of the Dependence of Mg II Emission on the Rotational Periods of Main-Sequence Stars. *L. Hartmann, S. L. Baliunas, D. K. Duncan, and R. W. Noyes*. **279**, 778, 46-C10 (1984)
- Rotational Velocities of Low-Mass Stars in the Pleiades. *John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham*. **280**, 202, 51-C4 (1984)
- Absolute Dimensions and Masses of Eclipsing Binaries. IV. EE Pegasi Is a Triple Star. *Claud H. Lacy and Daniel M. Popper*. **281**, 268, 63-G2 (1984)
- Measurements of Rotation and Turbulence in F, G, and K Dwarfs. *David F. Gray*. **281**, 719, 70-D3 (1984)
- The Applicability of the Fourier Convolution Theorem to the Analysis of Late-Type Stellar Spectra. *David H. Bruning*. **281**, 830, 71-E7

Stars: Rotation—Continued

- (1984)
On the Emission of Gravitational Radiation from Inhomogeneous Jacobi Configurations. *James R. Ipser and Robert A. Matzner*. **282**, 287, 77-A8 (1984)
Rotating Neutron Star Structure: Implications of the Millisecond Pulsar PSR 1937 + 214. *A. Ray and B. Datta*. **282**, 542, 81-A10 (1984)
Winds from Rotating, Magnetic, Hot Stars. I. General Model Results. *David B. Friend and Keith B. MacGregor*. **282**, 591, 81-E3 (1984)
Rapid Rotation and H α Emission Anomalies among Some Members of the Population of Low-Mass Stars. *Arthur Young, Andrew Skumanich, and Eugene Harlan*. **282**, 683, 82-D13 (1984)
New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. *P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pradhan, N. E. White, K. S. Wood, and D. J. Yentis*. **283**, L53, 97-C2 (1984)
Age-Rotation Relationship for Late-Type Main-Sequence Stars. *T. N. Rengarajan*. **283**, L63, 97-C14 (1984)
The Many Faces of Capella: A Search for Rotational Modulations and a Study of Systematic Velocities of Emission Lines in the Ultraviolet. *Thomas R. Ayres*. **284**, 784, 107-E7 (1984)
Be Stars in Binaries. *Helmut A. Abt and Octavio Cardona*. **285**, 190, 112-A10 (1984)
The FK Comae Candidate UZ Librae. *Bernard W. Bopp, Bret D. Goodrich, John L. Africano, P. V. Noah, R. J. Meredith, Leigh Hunt Palmer, and Robert J. Quigley*. **285**, 202, 112-B8 (1984)
The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. *G. Channugam and A. Ray*. **285**, 252, 112-F3 (1984)
The Collapse of Rotating Stellar Cores: Equilibria between White Dwarf and Neutron Star Densities. *Joel E. Tohline*. **285**, 721, 119-D2 (1984)
Magnetorotational Iron Core Collapse. *Eugene M. D. Symbalisty*. **285**, 729, 119-D10 (1984)
Meridional Circulation in Rotating Stars. VIII. The Solar Spin-down Problem. *Monique Tassoul and Jean-Louis Tassoul*. **286**, 350, 125-F7 (1984)
Rotational Velocities of Later B Type and A Type Stars as Determined from Ultraviolet versus Visual Line Profiles. *Kenneth G. Carpenter, Arne Slettebak, and George Sonneborn*. **286**, 741, 131-C2 (1984)
The Space Orientation of Stars. *Laurance R. Doyle, Thomas J. Wilcox, and Jean J. Lorre*. **287**, 307, 136-C10 (1984)
The Relation between Stellar Rotation Rate and Activity Cycle Periods. *Robert W. Noyes, Nigel O. Weiss, and Arthur H. Vaughan*. **287**, 769, 142-F6 (1984)
Metal Abundances in the Hot DA White Dwarfs Wolf 1346 and Feige 24. *F. Wesemael, R. B. C. Henry, and H. L. Shipman*. **287**, 868, 143-F11 (1984)
Accurate Integrations of the Roche Model. *Stefan W. Mochnacki*. **55**, 551, 19-A9 (1984) (Abstr. in **282**, 820, 84-A10)

Stars: RR Lyrae

- Convection in Pulsating Stars. III. The RR Lyrae Instability Strip. *R. F. Stellingwerf*. **277**, 322, 14-D7 (1984)
Convection in Pulsating Stars. IV. Nonlinear Effects. *R. F. Stellingwerf*. **277**, 327, 14-D12 (1984)
The Baade-Wesselink Method and the Distances to RR Lyrae Stars. I. The Field Star VY Serpentis. *Bruce W. Carney and David W. Latham*. **278**, 241, 26-E11 (1984)
Metal Abundances of Galactic Globular Clusters. *Horace A. Smith*. **281**, 148, 62-E3 (1984)
A Search for Distant Halo RR Lyrae Stars. *A. Saha*. **283**, 580, 93-B11 (1984)
Color-Magnitude Diagram Photometry of the LMC Red Cluster NGC 1978. *Edward W. Olszewski*. **284**, 108, 99-B11 (1984)
Convection in Pulsating Stars. V. Limit Cycle Characteristics. *R. F. Stellingwerf*. **284**, 712, 106-G1 (1984)
Spectroscopy and Spectrophotometry of Distant Halo RR Lyrae Stars. *A. Saha and J. B. Oke*. **285**, 688, 119-A9 (1984)

Stars: RV Tauri

- OH Maser Emission from Warm Variable Stars. *John D. Fix and Mark J. Claussen*. **287**, L35, 138-E8 (1984)

Stars: Semiregular Variables

- OH Maser Emission from Warm Variable Stars. *John D. Fix and Mark J. Claussen*. **287**, L35, 138-E8 (1984)

Stars: Spectral Classification

- The Nature of the Visual Companions of Ap and Am Stars. *Helmut A. Abt and Octavio Cardona*. **276**, 266, 3-F10 (1984)
Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si IV Stellar Wind Effect. *Nolan R. Walborn and Robert J. Panek*. **280**, L27, 54-E3 (1984)
Be Stars in Binaries. *Helmut A. Abt and Octavio Cardona*. **285**, 190, 112-A10 (1984)

Spectroscopic Tests of Photoelectric Stellar Classification of Abnormal Stars. *Helmut A. Abt*. **285**, 247, 112-E12 (1984)

- New Results for HD 161796. *J. D. Fernie and R. F. Garrison*. **285**, 698, 119-B5 (1984)

Ultraviolet Spectral Morphology of the O Stars. II. The Main Sequence. *Nolan R. Walborn and Robert J. Panek*. **286**, 718, 131-A4 (1984)

- Close Visual Binaries. I. ML Classifications. *Christopher J. Corbally*. **55**, 657, 20-E8 (1984) (Abstr. in **282**, 822, 84-A12)

Stars: Spectrum Variables

- Comparison of Variations in the Visible and Ultraviolet Spectra of a Centauri. *Richard P. Fahey*. **55**, 507, 17-F3 (1984) (Abstr. in **281**, 892, 72-C5)

Stars: Stellar Dynamics

- Preferred Orbit Planes in Triaxial Galaxies. I. Tumbling about a Principal Axis. *Thomas Y. Steiman-Cameron and Richard H. Durisen*. **276**, 101, 2-A10 (1984)
The Self-consistent Response of Stellar Disks to Bar Forcing. *K. O. Thielheim and H. Wolff*. **276**, 135, 2-D2 (1984)
Stability of Gravitational Systems and Gravitational Catastrophe in Astrophysics. *J. F. Sygnet, G. Des Forêts, M. Lachièze-Rey, and R. Pellat*. **276**, 737, 9-E5 (1984)
Is There Life after Core Collapse in Globular Clusters? *Haldan Cohn and Piet Hut*. **277**, L45, 22-E10 (1984)
Surface Photometry in Cores of Globular Clusters. *S. Djorgovski and Ivan R. King*. **277**, L49, 22-E14 (1984)
Core Collapse with Strong Encounters: Erratum. *Jeremy Goodman*. **278**, 893, 35-E11 (1984) (Orig. paper in **270**, 700, 85-F10)
On the Formation and Dynamics of Shells around Elliptical Galaxies. *P. J. Quinn*. **279**, 596, 44-C14 (1984)
Stellar Orbits in Angle Variables. *Stephen J. Ratcliff, Kar Man Chang, and M. Schwarzschild*. **279**, 610, 44-D14 (1984)
Galactic Warps and the Shape of Heavy Halos. *Linda S. Sparke*. **280**, 117, 50-C8 (1984)
Homologous Evolution of Stellar Systems after Core Collapse. *Jeremy Goodman*. **280**, 298, 52-C4 (1984)
AB Stars in the Southern Galactic Halo. III. Kinematics of the Halo. *Jeffrey R. Pier*. **281**, 260, 63-F8 (1984)
Phase-Space Correlation Functions and Isolating Integrals. *Paolo Carnevali and Paolo Santangelo*. **281**, 473, 65-B2 (1984)
The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. *J. H. Krolik, A. Meiksin, and P. C. Joss*. **282**, 466, 80-C4 (1984)
A Unified N-Body and Statistical Treatment of Stellar Dynamics. I. The Hybrid Code. *Stephen L. W. McMillan and Alan P. Lightman*. **283**, 801, 95-F3 (1984)
A Unified N-Body and Statistical Treatment of Stellar Dynamics. II. Applications to Globular Cluster Cores. *Stephen L. W. McMillan and Alan P. Lightman*. **283**, 813, 95-G1 (1984)
Violent Relaxation and Dissipationless Collapse. *Jens Verner Villumsen*. **284**, 75, 98-F11 (1984)
The Structure and Dynamics of the Open Cluster M11. *Robert D. Mathieu*. **284**, 643, 106-B2 (1984)
Effects of Encounters with Field Stars on the Evolution of Low-Mass Semidetached Binaries. *Piet Hut and Bohdan Paczyński*. **284**, 675, 106-D6 (1984)
Velocity Dispersions of Disk Stars in Spiral Galaxies. *John N. Bahcall and Stefano Casertano*. **284**, L35, 109-B5 (1984)
Globular Cluster Swapping in Clusters of Galaxies. *J. C. Muzzio, R. E. Martinez, and M. Rabolli*. **285**, 7, 110-A12 (1984)
Milgrom's Revision of Newton's Laws: Dynamical and Cosmological Consequences. *James E. Felten*. **286**, 3, 122-A7 (1984)
Preferred Orbit Planes in Triaxial Galaxies. II. Tumbling about a Nonprincipal Axis. *Laurence P. David, Richard H. Durisen, and Thomas Y. Steiman-Cameron*. **286**, 53, 122-E1 (1984)
On Schwarzschild's Method for the Construction of Model Galaxies. *Peter O. Vandervoort*. **287**, 475, 139-D1 (1984)
Isothermal Spheres in the Modified Dynamics. *M. Milgrom*. **287**, 571, 140-D3 (1984)
Recognizing Merger Remnants among Normal Elliptical Galaxies: NGC 5813. *John Kormendy*. **287**, 577, 140-D9 (1984)
Hard Binary-Single Star Scattering Cross Sections for Equal Masses. *Piet Hut*. **55**, 301, 15-B1 (1984) (Abstr. in **280**, 940, 60-B4)
The A0 Stars. *Olin J. Eggen*. **55**, 597, 20-A1 (1984) (Abstr. in **282**, 821, 84-A11)
The A0 Stars: Erratum. *Olin J. Eggen*. **56**, 650, 33-C3 (1984) (Orig. paper in **55**, 597, 20-A1)

Stars: Stellar Statistics

- The Distribution of Stars Perpendicular to a Galactic Disk. *John N. Bahcall*. **276**, 156, 2-E9 (1984)
On the Suggested Peculiarity of the Galactic Globular Cluster NGC 288. *Roberto Buonanno, Carlo E. Corsi, Flavio Fusi Pecci, Gonzalo Alcaino, and William Liller*. **277**, 220, 13-C12 (1984)

Stars: Stellar Statistics—Continued

- On the Frequency of Planetary Nebula Nuclei Powered by Helium Burning and on the Frequency of White Dwarfs with Hydrogen-deficient Atmospheres. *Icko Iben, Jr.* **277**, 333, 14-E4 (1984)
- Constraints on the Masses of Supernova Progenitors. *Robert C. Kennicutt, Jr.* **277**, 361, 14-G4 (1984)
- Cosmological Consequences of Population III Stars. *B. J. Carr, J. R. Bond, and W. D. Arnett.* **277**, 445, 17-A5 (1984)
- The Einstein Galactic Plane Survey: Statistical Analysis of the Complete X-Ray Sample. *Paul Hertz and Jonathan E. Grindlay.* **278**, 137, 25-E3 (1984)
- The Population Structure of the Large Magellanic Cloud Bar. *Eduardo Hardy, Roberto Buonanno, Carlo E. Corsi, Kenneth A. Janes, and Robert A. Schommer.* **278**, 592, 32-D3 (1984)
- The Appearance, Number, and History of Highly Compact Binary Systems in Globular Clusters. *Julian H. Krolik.* **282**, 452, 80-B4 (1984)
- Are Cataclysmic Variables the Progenitors of Type I Supernovae? *Jim MacDonald.* **283**, 241, 88-E14 (1984)
- K Giants and the Total Amount of Matter near the Sun. *John N. Bahcall.* **287**, 926, 144-C13 (1984)
- Supernovae of Type I as End Products of the Evolution of Binaries with Components of Moderate Initial Mass ($M \leq 9 M_{\odot}$). *Icko Iben, Jr. and Alexander V. Tutukov.* **54**, 335, 6-A1 (1984) (Abstr. in **276**, 800, 10-B12)
- Comparisons of a Standard Galaxy Model with Stellar Observations in Five Fields. *John N. Bahcall and Raymond M. Soneira.* **55**, 67, 11-E12 (1984) (Abstr. in **279**, 910, 47-G1)

Stars: Subdwarfs

- The Close Binary Central Star of the Planetary Nebula Abell 41: A Helium-rich Subdwarf Primary. *Richard F. Green, James Liebert, and F. Wesemael.* **280**, 177, 51-A1 (1984)
- Nonradial Instability Strips Based on Carbon and Oxygen Partial Ionization in Hot, Evolved Stars. *Summer Starrfield, Arthur N. Cox, Russell B. Kidman, and W. D. Pesnell.* **281**, 800, 71-C4 (1984)
- Far-Ultraviolet Spectrophotometry of Two Very Hot O Type Subdwarfs. *J. S. Drilling, J. B. Holberg, and D. Schönberner.* **283**, L67, 97-D3 (1984)

Stars: Supergiants

- LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? *D. Schönberner and J. S. Drilling.* **276**, 229, 3-D1 (1984)
- A Photometric Comparison of Late-Type Cluster Supergiants in the Magellanic Clouds and the Galaxy. *P. J. McGregor and A. R. Hyland.* **277**, 149, 12-E7 (1984)
- IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti.* **278**, 124, 25-D2 (1984)
- Mass Loss in A and B Supergiants and the Extragalactic Distance Scale. *R. Brent Tully and S. C. Wolff.* **281**, 67, 61-F3 (1984)
- Oxygen Isotopes in the Atmospheres of Betelgeuse and Antares. *Michael J. Harris and David L. Lambert.* **281**, 739, 70-E9 (1984)
- The 1982 Eclipse of 31 Cygni. *Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman.* **281**, 751, 70-F7 (1984)
- The Distance to NGC 2403 Based on Near-Infrared Observations of Cepheids. *Christopher W. McAlary and Barry F. Madore.* **282**, 101, 75-A13 (1984)
- Recombination Stellar Wind Model for the Coronae of Early-Type Stars. *Wayne L. Waldron.* **282**, 256, 75-F4 (1984)
- High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. *A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres.* **283**, 731, 95-A1 (1984)
- Carbon, Nitrogen, and Oxygen Abundances in Betelgeuse. *David L. Lambert, Jeffrey A. Brown, Kenneth H. Hinkle, and Hollis R. Johnson.* **284**, 223, 100-D14 (1984)
- Characteristics of the Fe II and C II Emission in High-Resolution IUE Spectra (2300–3000 Å) of Alpha Orionis. *Kenneth G. Carpenter.* **285**, 181, 112-A1 (1984)
- The Ultraviolet Variability of Early-Type Supergiants. *Anne B. Underhill.* **285**, 668, 118-G1 (1984)
- New Results for HD 161796. *J. D. Fernie and R. F. Garrison.* **285**, 698, 119-B5 (1984)
- The Epsilon Aurigae Secondary: A Binary Embedded within a Disk? *Jack J. Lissauer and Dana E. Backman.* **286**, L39, 132-D10 (1984)
- Yellow Giants in Young Clusters. II. A Comparison of Observation with Theory. *Edward G. Schmidt.* **287**, 261, 135-F11 (1984)
- Ultraviolet and Optical Studies of Binaries with Luminous Cool Primaries and Hot Companions. III. Reticon Radial Velocities: Erratum. *Sidney B. Parsons.* **54**, 372, 6-C10 (1984) (Orig. paper in **53**, 553, 24-E1)
- The Early-Type Strong Emission-Line Supergiants of the Magellanic

Clouds: A Spectroscopic Zoology. *Steven N. Shore and N. Sanduleak.* **55**, 1, 11-A2 (1984) (Abstr. in **279**, 909, 47-F14)

Stars: Supernovae

- Double White Dwarfs as Progenitors of R Coronae Borealis Stars and Type I Supernovae. *R. F. Webbink.* **277**, 355, 14-F12 (1984)
- Constraints on the Masses of Supernova Progenitors. *Robert C. Kennicutt, Jr.* **277**, 361, 14-G4 (1984)
- Evolution of 8–10 M_{\odot} Stars toward Electron Capture Supernovae. I. Formation of Electron-Degenerate O + Ne + Mg Cores. *Ken'ichi Nomoto.* **277**, 791, 20-F11 (1984)
- Did the First Metals in Our Galaxy Come from Virgo Cluster Supernovae? *George Wallerstein.* **278**, 663, 33-B12 (1984)
- A Search for Young, Luminous Optical Pulsars in Extragalactic Supernova Remnants. *John Middleton and Jerome Kristian.* **279**, 157, 38-F5 (1984)
- Supernovae in Cataclysmic Variable Systems and the Formation of Low-Mass X-Ray Binaries. *Ronald E. Taam and B. A. Fryxell.* **279**, 166, 38-G2 (1984)
- Explosive Nucleosynthesis of Type I Supernovae. *K. Nomoto, F.-K. Thielemann, and J. C. Wheeler.* **279**, L23, 42-E9 (1984)
- ^{26}Al in the Interstellar Medium. *Donald D. Clayton.* **280**, 144, 50-E8 (1984)
- Models for Type I Supernovae: Partially Incinerated White Dwarfs. *Peter G. Sutherland and J. Craig Wheeler.* **280**, 282, 52-B2 (1984)
- The Laboratory Simulation of Unmagnetized Supernova Remnants: Absence of a Blast Wave. *Joseph E. Borovsky, Morris B. Pongratz, Robert A. Roussel-Dupré, and Tai-Ho Tan.* **280**, 802, 58-E10 (1984)
- Interstellar Absorption Lines in the Spectrum of Supernova Evans in M83 (NGC 5236). *Edward B. Jenkins, A. W. Rodgers, Paul Harding, Donald C. Morton, and Donald G. York.* **281**, 585, 69-A5 (1984)
- A New Similarity Solution for Reverse Shocks in Supernova Remnants. *A. J. S. Hamilton and C. L. Sarazin.* **281**, 682, 70-A5 (1984)
- Are Cataclysmic Variables the Progenitors of Type I Supernovae? *Jim MacDonald.* **283**, 241, 88-E14 (1984)
- On Detecting Stellar Collapse with Neutrinos. *Adam Burrows.* **283**, 848, 96-B11 (1984)
- Explosive Nucleosynthesis and Type I Supernovae: Erratum. *K. Nomoto, F.-K. Thielemann, and J. C. Wheeler.* **283**, L25, 91-F12 (1984) (Orig. paper in **279**, L23, 42-E9)
- Explosive Nucleosynthesis in Massive Stars: Comparison with the Cassiopeia A Fast-moving Knots. *M. D. Johnston and A. Yahil.* **285**, 587, 118-A4 (1984)
- Magnetorotational Iron Core Collapse. *Eugene M. D. Symbalisty.* **285**, 729, 119-D10 (1984)
- Electron Capture Supernovae: One-Zone Collapse Calculation for Stars with Masses 10 M_{\odot} and 15 M_{\odot} . *A. Ray, S. M. Chitre, and K. Kar.* **285**, 766, 119-G6 (1984)
- Radio Emission from a Type I Supernova: SN 1983.51 in NGC 5236. *R. A. Sramek, N. Panagia, and K. W. Weiler.* **285**, L59, 121-E2 (1984)
- The Circumstellar Interaction Model for the Radio Emission from a Type I Supernova. *Roger A. Chevalier.* **285**, L63, 121-E6 (1984)
- HEAO 3 Discovery of ^{26}Al in the Interstellar Medium. *W. A. Mahoney, J. C. Ling, Wm. A. Wheaton, and A. S. Jacobson.* **286**, 578, 129-D14 (1984)
- Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. *Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi.* **286**, 644, 130-B14 (1984)
- The 1984 Supernova in NGC 3169: Evidence for a Superwind. *Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz.* **287**, L69, 145-D7 (1984)
- Supernovae of Type I as End Products of the Evolution of Binaries with Components of Moderate Initial Mass ($M \leq 9 M_{\odot}$). *Icko Iben, Jr. and Alexander V. Tutukov.* **54**, 335, 6-A1 (1984) (Abstr. in **276**, 800, 10-B12)

Stars: U Geminorum

- Radial Velocity Studies of Cataclysmic Binaries. II. The Ultrashort Period Dwarf Nova T Leonis. *Allen W. Shafter and Paula Szkody.* **276**, 305, 4-B7 (1984)
- Ultraviolet Spectroscopy of the Dwarf Nova U Geminorum. *R. J. Panek and A. V. Holm.* **277**, 700, 19-F11 (1984)
- Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. *F. A. Cordova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire.* **278**, 739, 34-A9 (1984)

Stars: Variables

- CPD - 48°1577: The Brightest Known Cataclysmic Variable. *R. F. Garrison, R. E. Schild, W. A. Hiltner, and W. Krzeminski.* **276**, L13, 5-E13 (1984)
- The Spectrum of V348 Sagittarii. *Oued Dahari and Donald E. Osterbrock.* **277**, 648, 14-B7 (1984)
- IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. *R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti.* **278**, 124, 25-D2 (1984)

Stars: Variables—Continued

- Brightness Variations Caused by Surface Magnetic Fields in Pre-Main-Sequence Stars. *I. Appenzeller and D. S. P. Dearborn.* **278**, 689, 33-D10 (1984)
- Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. *F. A. Córdoba, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire.* **278**, 739, 34-A9 (1984)
- PG 1654 + 160: A New Pulsating DB White Dwarf. *D. E. Winget, E. L. Robinson, R. E. Nather, and Suchitra Balachandran.* **279**, L15, 42-E2 (1984)
- Rotational Velocities of Low-Mass Stars in the Pleiades. *John R. Stauffer, Lee Hartmann, David R. Soderblom, and Neal Burnham.* **280**, 202, 51-C4 (1984)
- Long-Term Observations of X-Ray Sources: The Aquila-Serpens-Scutum Region. *W. C. Priedhorsky and J. Terrell.* **280**, 661, 57-A14 (1984)
- Stable Nonradial Pulsations in 53 Persei from 1977 to 1983. *Myron A. Smith, Walter S. Fitch, John L. Africano, Bret D. Goodrich, W. Halbedel, Leigh H. Palmer, and Gregory W. Henry.* **282**, 226, 76-D2 (1984)
- SiO Flux Measurements of Variable Stars. *F. O. Clark, T. H. Troland, G. H. Pepper, and D. R. Johnson.* **283**, 174, 88-A2 (1984)
- Color Anomalies and Starspots in Hyades Dwarfs. *Bruce Campbell.* **283**, 209, 88-C9 (1984)
- Spectroscopic Evidence for Starspots in the G Dwarf HD 1835. *Bruce Campbell and Roger Cayrel.* **283**, L17, 91-F5 (1984)
- X-Ray Photometry and Spectroscopy of T Tauri Stars. *F. M. Walter and L. V. Kuhl.* **284**, 194, 100-B12 (1984)
- The Ultraviolet Variability of Early-Type Supergiants. *Anne B. Underhill.* **285**, 668, 118-G1 (1984)
- Rotational Mode Splitting about an Inclined Axis. *Morris L. Aizenman, Carl J. Hansen, John P. Cox, and W. Dean Pesnell.* **286**, L43, 132-D13 (1984)
- Faint Blue Objects at High Galactic Latitude. IV. Palomar Schmidt Fields Centered on Selected Areas 55 and 94. *Ke-Liang Huang and Peter D. Usher.* **56**, 393, 28-B1 (1984) (Abstr. in **285**, 875, 121-A6)
- Stars: Visual Multiples**
- The Nature of the Visual Companions of Ap and Am Stars. *Helmut A. Abt and Octavio Cardona.* **276**, 266, 3-F10 (1984)
- The Remarkable Multiple Mode δ Scuti Star BDS 1269A. *Bernard J. McNamara and Stephen J. Horan.* **282**, 741, 83-B9 (1984)
- The Triple Star Zeta Aquarii. *W. D. Heintz.* **284**, 806, 107-F3 (1984)
- Close Visual Binaries. II. Quantitative Test of Isochrones. *Christopher J. Corbally.* **285**, 195, 112-B1 (1984)
- Photographic Measures of Double Stars. *F. J. Josties and R. S. Harrington.* **54**, 103, 2-D5 (1984) (Abstr. in **275**, 928, 147-F1)
- Speckle Interferometric Measurements of Binary Stars. IX. *Harold A. McAlister, William I. Hartkopf, Barbara J. Gaston, Elaine M. Hendry, and Francis C. Fekel.* **54**, 251, 5-A1 (1984) (Abstr. in **276**, 799, 10-B11)
- Close Visual Binaries. I. ML Classifications. *Christopher J. Corbally.* **55**, 657, 20-E8 (1984) (Abstr. in **282**, 822, 84-A12)
- Stars: Weak-Line**
- Cosmological Consequences of Population III Stars. *B. J. Carr, J. R. Bond, and W. D. Arnett.* **277**, 445, 17-A5 (1984)
- Nitrogen Abundances in Disk and Halo Dwarfs. *Jocelyn Tomkin and David L. Lambert.* **279**, 220, 39-D8 (1984)
- Spectroscopic Tests of Photoelectric Stellar Classification of Abnormal Stars. *Helmut A. Abt.* **285**, 247, 112-E12 (1984)
- The Ultra-Metal-deficient (Population III?) Red Giant CD -38°245. *M. S. Bessell and John Norris.* **285**, 622, 118-C11 (1984)
- On the Evolution of an Intermediate-Mass Zero-Metal Star Which Does Not Experience Thermal Instabilities during the Double Shell Burning Phase. *Alessandro Chieffi and Amedeo Tornambè.* **287**, 745, 142-D10 (1984)
- Hydrogen and Helium Burning in Zero-Metal Asymptotic Giant Branch Stars and the Existence of Thresholds (in Core Mass and CNO Abundances) for the Occurrence of Helium Shell Flashes. *Masayuki Y. Fujimoto, Icko Iben, Jr., Alessandro Chieffi, and Amedeo Tornambè.* **287**, 749, 142-D14 (1984)
- Stars: White Dwarfs**
- Spectrophotometry of the White Dwarfs. *Jesse L. Greenstein.* **276**, 602, 8-B6 (1984)
- A Numerical Study of the Stability of Radiative Shocks. *James N. Imamura, Michael T. Wolff, and Richard H. Durisen.* **276**, 667, 8-G2 (1984)
- The Pulsating Central Star of the Planetary Nebula Kohoutek 1-16. *Albert D. Grauer and Howard E. Bond.* **277**, 211, 13-C3 (1984)
- On the Frequency of Planetary Nebula Nuclei Powered by Helium Burning and on the Frequency of White Dwarfs with Hydrogen-deficient Atmospheres. *Icko Iben, Jr.* **277**, 333, 14-E4 (1984)
- Double White Dwarfs as Progenitors of R Coronae Borealis Stars and Type I Supernovae. *R. F. Webbink.* **277**, 355, 14-F12 (1984)
- GD 323: A White Dwarf with a Stratified H/He Atmosphere? *James Liebert, F. Wesemael, E. M. Sion, and G. Wegner.* **277**, 692, 19-F3 (1984)
- Evolution of 8–10 M_{\odot} Stars toward Electron Capture Supernovae. I. Formation of Electron-Degenerate O + Ne + Mg Cores. *Ken'ichi Nomoto.* **277**, 791, 20-F11 (1984)
- Carbon in the Cool DC and C₂ White Dwarfs: Dredge-up in Compositionally Stratified Envelopes. *G. Fontaine, B. Villeneuve, F. Wesemael, and G. Wegner.* **277**, L61, 22-F12 (1984)
- Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. *Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman.* **278**, 255, 26-F11 (1984)
- The ZZ Ceti Star GD 385 Revisited. *S. O. Kepler.* **278**, 754, 34-B10 (1984)
- Diffusion in White Dwarf Stars. *David Muchmore.* **278**, 769, 34-C11 (1984)
- Narrow-Band Infrared Photometry of the Peculiar White Dwarf LHS 1126. *M. J. Lebofsky and James Liebert.* **278**, L111, 36-B13 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. II. Crystalline Lattice Case. *Naoki Itoh, Noriyoshi Matsumoto, Midori Seki, and Yasuharu Kohyama.* **279**, 413, 41-D10 (1984)
- Two New Extremely Hot Pulsating White Dwarfs. *Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert.* **279**, 751, 46-A10 (1984)
- IUE Spectrophotometry of the DA4 Primary in the Short-Period White Dwarf—Red Dwarf Spectroscopic Binary Case 1. *E. M. Sion, F. Wesemael, and E. F. Guinan.* **279**, 758, 46-B3 (1984)
- PG 1654 + 160: A New Pulsating DB White Dwarf. *D. E. Winget, E. L. Robinson, R. E. Nather, and Suchitra Balachandran.* **279**, L15, 42-E2 (1984)
- Diffusion-induced Hydrogen Burning in Helium-rich White Dwarfs. *G. Michaud, G. Fontaine, and Y. Charland.* **280**, 247, 51-F8 (1984)
- Models for Type I Supernovae: Partially Incinerated White Dwarfs. *Peter G. Sutherland and J. Craig Wheeler.* **280**, 282, 52-B2 (1984)
- The Far-Ultraviolet Energy Distribution of Sirius B from *Voyager 2*. *J. B. Holberg, F. Wesemael, and I. Hebejy.* **280**, 679, 57-C5 (1984)
- Evolution of the Optical Spectrum of HM Sagittae: 1977–1982. *John R. Stauffer.* **280**, 695, 57-D7 (1984)
- Temperatures and Surface Gravities of DB White Dwarfs. *J. B. Oke, V. Weidemann, and D. Koester.* **281**, 276, 64-A1 (1984)
- The Effect of Diffusion on Pre-nova Evolution: CNO-enriched Envelopes. *Dina Prialnik and Attay Kovetz.* **281**, 367, 65-A1 (1984)
- The Identification of Hydrogen in Grw + 70°8247. *Jesse L. Greenstein.* **281**, L47, 67-A1 (1984)
- Implications of the Absolute Magnitude Distribution Functions of DA and Non-DA White Dwarfs. *Edward M. Sion.* **282**, 612, 81-F10 (1984)
- Cooling of Low-Mass Carbon-Oxygen Dwarfs from the Planetary Nucleus Stage through the Crystallization Stage. *Icko Iben, Jr. and Alexander V. Tutukov.* **282**, 615, 81-F13 (1984)
- On the Magnetic Field in the White Dwarf Grw + 70°8247. *Ronald J. W. Henry and R. F. O'Connell.* **282**, L97, 85-D14 (1984)
- Are Cataclysmic Variables the Progenitors of Type I Supernovae? *Jim MacDonald.* **283**, 241, 88-E14 (1984)
- Polarization Angle in Magnetic White Dwarfs. *Brian Martin and D. T. Wickramasinghe.* **283**, 782, 95-D11 (1984)
- Diffusion-induced Hydrogen Burning and the Evolution of DA White Dwarfs. *G. Michaud and G. Fontaine.* **283**, 787, 95-E2 (1984)
- Analyses of the Visual Spectra of White Dwarfs Containing Carbon. *G. Wegner and F. H. Yackovich.* **284**, 257, 100-G6 (1984)
- The Discontinuity near 1600 Å in the Spectra of DA White Dwarfs. *Gary Wegner.* **284**, L43, 109-B13 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 - 451 in the High and Low States. *L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips.* **285**, 214, 112-C6 (1984)
- Comparison of the X-Ray Observations of the AM Herculis Objects to Theory. *James N. Imamura.* **285**, 223, 112-D2 (1984)
- The Rotational and Orbital Evolution of Cataclysmic Binaries Containing Magnetic White Dwarfs. *G. Channugam and A. Ray.* **285**, 252, 112-F3 (1984)
- Neutrino-Pair Bremsstrahlung in Dense Stars. IV. Phonon Contributions in the Crystalline Lattice Phase. *Naoki Itoh, Yasuharu Kohyama, Noriyoshi Matsumoto, and Midori Seki.* **285**, 304, 113-C2 (1984)
- The Collapse of Rotating Stellar Cores: Equilibria between White Dwarf and Neutron Star Densities. *Joel E. Tohline.* **285**, 721, 119-D2 (1984)
- Do Monopoles Keep White Dwarfs Hot? *Katharine Freese.* **286**, 216, 124-C8 (1984)
- Light and Line Profile Variations due to r -Mode Pulsations with an Application to the ZZ Ceti Star G117-B15A. *S. O. Kepler.* **286**, 314,

- 125-C13 (1984)
 The Magnetic Field of the AM Herculis Object H0139-68. *D. T. Wickramasinghe, N. Visvanathan, and I. R. Tuohy*. **286**, 328, 125-D13 (1984)
 Accreting White Dwarf Models for Type I Supernovae. III. Carbon Deflagration Supernovae. *Ken'ichi Nomoto, Friedrich-K. Thielemann, and Koichi Yokoi*. **286**, 644, 130-B14 (1984)
 Feige 24: Wind/Flare Accretion by a Hot Dazl Degenerate. *E. M. Sion and S. G. Starrfield*. **286**, 760, 131-D7 (1984)
 Ultraviolet Radiation from White Dwarfs and the Carbon Ionization in the Galactic Halo. *Nino Panagia and Yervant Terzian*. **287**, 315, 136-D5 (1984)
 Metal Abundances in the Hot DA White Dwarfs Wolf 1346 and Feige 24. *F. Wesemael, R. B. C. Henry, and H. L. Shipman*. **287**, 868, 143-F11 (1984)
 Faint Blue Objects at High Galactic Latitude. IV. Palomar Schmidt Fields Centered on Selected Areas 55 and 94. *Ke-Liang Huang and Peter D. Usher*. **56**, 393, 28-B1 (1984) (Abstr. in **285**, 875, 121-A6)
- Stars: Winds**
 Radio Emission from the Outer Parts of Stellar Atmospheres (Mantles) at Centimeter Wavelengths and the Winds of Early-Type Stars. *Anne B. Underhill*. **276**, 583, 8-A1 (1984)
 Some Effects of Rotation on the Structure and Dynamics of a Radiation-driven Wind from a Hot Star. *J. M. Marlborough and M. Zamir*. **276**, 706, 9-C2 (1984)
 On the Composition of the Stellar Winds of the Most Massive Stars: 100 M_{\odot} to 2200 M_{\odot} . *D. S. P. Dearborn and J. B. Blake*. **277**, 783, 20-F3 (1984)
 Far-Infrared and Submillimeter Observations of the Low-Luminosity Protostars L1455 FIR and L1551 IRS 5: The Confinement of Bipolar Outflows. *J. A. Davidson and D. T. Jaffe*. **277**, L13, 16-A13 (1984)
 A Wind-Type Model for the Generation of Astrophysical Jets. *A. Ferrari, S. R. Habbal, R. Rosner, and K. Tsinganos*. **277**, L35, 22-E1 (1984)
 Hydrodynamic Ejection of Bipolar Flows from Objects Undergoing Disk Accretion: T Tauri Stars, Massive Pre-Main-Sequence Objects, and Cataclysmic Variables. *Michael V. Torbett*. **278**, 318, 27-D10 (1984)
 Photoionized Stellar Wind Bubbles in a Cloudy Medium. *Christopher F. McKee, Dave Van Buren, and Bernard Lazareff*. **278**, L115, 36-C3 (1984)
 Colliding Winds: Interaction Regions with Strong Heat Conduction. *James N. Imamura and Roger A. Chevalier*. **280**, 313, 52-D5 (1984)
 The Distribution of Shocked Gas in the Bipolar Nebulae CRL 2688 and CRL 618. *S. Beckwith, S. C. Beck, and I. Gatley*. **280**, 648, 57-A1 (1984)
 Do Bipolar Magnetic Regions Exist on the Surfaces of Early-Type Stars? *Anne B. Underhill and Richard P. Fahey*. **280**, 712, 57-E11 (1984)
 Mass Loss in T Tauri Stars: Observational Studies of the Cool Parts of Their Stellar Winds and Expanding Shells. *Reinhard Mundt*. **280**, 749, 58-A9 (1984)
 Energy Balance of Stellar Coronae. III. Effect of Stellar Mass and Radius. *Reiner Hammer*. **280**, 780, 58-D3 (1984)
 The T Tauri Radio Source. *P. R. Schwartz, Theodore Simon, B. Zuckerman, and R. R. Howell*. **280**, L23, 54-D13 (1984)
 Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si IV Stellar Wind Effect. *Nolan R. Walborn and Robert J. Panek*. **280**, L27, 54-E3 (1984)
 The Structure of High-Velocity Gas in Orion and the Possible Role of IRC9. *S. C. Beck*. **281**, 205, 63-B9 (1984)
 Spectral Variability in Early-Type Binary X-Ray Systems. *Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson*. **282**, 245, 76-E7 (1984)
 Recombination Stellar Wind Model for the Coronae of Early-Type Stars. *Wayne L. Waldron*. **282**, 256, 75-F4 (1984)
 Winds from Rotating, Magnetic, Hot Stars. I. General Model Results. *David B. Fried and Keith B. MacGregor*. **282**, 591, 81-E3 (1984)
 Stellar Winds and Molecular Clouds: Herbig Be and Ae Type Stars. *Jorge Cantó, Luis F. Rodríguez, Nuria Calbet, and Russell M. Lebreault*. **282**, 631, 82-A1 (1984)
 Line Profile Variation in δ Orionis A, ϵ Orionis A, and 15 Monocerotis. *C. A. Grady, T. P. Snow, and W. C. Cash*. **283**, 218, 88-D4 (1984)
 IUE Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979-1983. *R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung*. **283**, 226, 88-D13 (1984)
 Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. *G. Hammerschlag-Hensberge, T. R. Kallman, and I. D. Howarth*. **283**, 249, 88-F8 (1984)
 Carotating Interaction Regions in Stellar Winds. *D. J. Mullan*. **283**, 303, 89-C11 (1984)
 Confinement of the Crab Pulsar's Wind by Its Supernova Remnant. *C. F. Kennel and F. V. Coroniti*. **283**, 694, 94-E2 (1984)
 Instabilities in Line-driven Stellar Winds. I. Dependence on Perturbation Wavelength. *S. P. Owocki and G. B. Rybicki*. **284**, 337, 101-F2 (1984)
 Wave Amplification in Line-driven Winds. *L. B. Lucy*. **284**, 351, 101-G2 (1984)
 Relativistic Charge-separated Winds. *F. C. Michel*. **284**, 384, 102-B7 (1984)
 The Evolution of Low-Mass Close Binaries Influenced by the Radiation of Gravitational Waves and by a Magnetic Stellar Wind. *Icko Iben, Jr. and Alexander V. Tutukov*. **284**, 719, 106-G8 (1984)
 Theory of Astrophysical SiO Masers. *S. H. Langer and W. D. Watson*. **284**, 751, 107-C1 (1984)
 Asymmetries in Stellar Mg II h and k and Ca II H and K Line Profiles: Discrepancies Between Mg and Ca Asymmetries. *D. J. Mullan*. **284**, 769, 107-D5 (1984)
 The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. *S. A. Drake, A. Brown, and J. L. Linsky*. **284**, 774, 107-D10 (1984)
 Bipolar Outflows in Dark Clouds. *Paul F. Goldsmith, Ronald L. Snell, Mark Hemeon-Heyer, and William D. Langer*. **286**, 599, 129-F7 (1984)
 Ultraviolet Spectral Morphology of the O Stars. II. The Main Sequence. *Nolan R. Walborn and Robert J. Panek*. **286**, 718, 131-A4 (1984)
 X-Rays from Accretion of Red Giant Winds. *M. Jura and D. J. Helfand*. **287**, 785, 142-G8 (1984)
 Main-Sequence B Stars with Strong Winds in the Core of NGC 6231. *Derck Massa, Blair D. Savage, and Joseph P. Cassinelli*. **287**, 814, 143-B9 (1984)
 The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. *Erika Böhm-Vitense, Paul Hodge, and Don Boggs*. **287**, 825, 143-C7 (1984)
 The 1984 Supernova in NGC 3169: Evidence for a Superwind. *Michael A. Dopita, Robert Evans, Martin Cohen, and Richard D. Schwartz*. **287**, L69, 145-D7 (1984)
 Jets from Young Stars: The Case of R Monocerotis. *Edward R. Brugel, Reinhard Mundt, and Thomas Bührke*. **287**, L73, 145-D10 (1984)
 The Evolution of Cataclysmic and Low-Mass X-Ray Binaries. *Joseph Patterson*. **54**, 443, 8-A8 (1984) (Abstr. in **278**, 894, 35-E12)
- Stars: Wolf-Rayet**
 Comments on the Ultraviolet Spectrum of γ^2 Velorum. *Jorge Sahade, Yoji Kondo, and George E. McCluskey, Jr.* **276**, 281, 3-G11 (1984)
 A Long-Period Orbit for the Binary Wolf-Rayet Star HD 193793. *WC7 + O4-5. Robert Lamontagne, Anthony F. J. Moffat, and Wilhelm Seggewiss*. **277**, 258, 13-F10 (1984)
 The Infrared Dust Shell around the WC9 Star Ve 2-45. *H. M. Dyck, Theodore Simon, and R. D. Wolstencroft*. **277**, 675, 19-D14 (1984)
 Absolute Spectrophotometry of Wolf-Rayet Stars from 1200 to 7000 Å: A Cautionary Tale. *Catharine D. Garmany, Philip Massey, and Peter S. Conti*. **278**, 233, 26-E3 (1984)
 The Spectra of Wolf-Rayet Stars. II. The WC 9 Subclass. *Ana V. Torres and Peter S. Conti*. **280**, 181, 51-A6 (1984)
 Ultraviolet Photometry from the Orbiting Astronomical Observatory. XXXIX. The Structure of the Eclipsing Wolf-Rayet Binary V444 Cygni as Derived from Light Curves between 2460 Å and 3.5 Microns. *A. M. Cherepashchuk, Joel A. Eaton, and Kh. F. Khalullin*. **281**, 774, 71-A4 (1984)
 Absolute Spectrophotometry of Northern Wolf-Rayet Stars: How Similar Are the Colors? *Philip Massey*. **281**, 789, 71-B5 (1984)
 Spectroscopic Studies of Wolf-Rayet Stars with Absorption Lines. VIII. HD 193793. *Peter S. Conti, Diane Roussel-Duprê, Philip Massey, and Michael Rensing*. **282**, 693, 82-E11 (1984)
 On the Nature of the Wolf-Rayet Component in the Core of the Massive Galactic H II Region NGC 3603. *Anthony F. J. Moffat and Virpi S. Niemela*. **284**, 631, 106-A4 (1984)
 Nitrogen and Helium Enrichment in Four Wolf-Rayet Ring Nebulae. *Karen B. Kwitter*. **287**, 840, 143-D9 (1984)
- Stars: W Ursae Majoris**
 Contact Binary Stars. I. An X-Ray Survey. *R. G. Cruddace and A. K. Dupree*. **277**, 263, 13-G1 (1984)
 Radio Observations of W Ursae Majoris Stars. *V. A. Hughes and B. J. McLean*. **278**, 716, 33-F10 (1984)
 A Radial Velocity Study of XY Leonis. *B. J. Hrivnak, E. F. Milone, G. Hill, and W. A. Fisher*. **285**, 683, 119-A4 (1984)
 Observations of the O'Connell Effect System VY Crucis. *E. F. Milone and B. J. Hrivnak*. **56**, 295, 27-A2 (1984) (Abstr. in **285**, 874, 121-A5)
- Sun: Abundances**
 Elemental Composition of Solar Energetic Particles. *W. R. Cook, E. C. Stone, and R. E. Vogt*. **279**, 827, 46-G3 (1984)
 A High-Resolution Study of the Isotopes of Solar Flare Nuclei. *R. A. Mewaldt, J. D. Spalding, and E. C. Stone*. **280**, 892, 59-E4 (1984)

Sun: Abundances-Continued

- Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. *G. M. Mason, G. Gloeckler, and D. Hovestadt*. **280**, 902, 59-E14 (1984)
- Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. *B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk*. **281**, 458, 66-A1 (1984)
- The Pure Rotation Spectrum of OH and the Solar Oxygen Abundance. *A. J. Sauwal, N. Grevesse, J. W. Brault, G. M. Stokes, and R. Zander*. **282**, 330, 77-D9 (1984)
- Survey of $\text{He}^+/\text{He}^{2+}$ Abundance Ratios in Energetic Particle Events. *D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer*. **282**, L39, 78-C12 (1984)

Sun: Activity

- Variations in the Solar Calcium K Line 1976-1982. *Stephen L. Keil and Simon P. Worden*. **276**, 766, 9-G6 (1984)
- The Effect of Rotation and the Magnetic Field on Solar Luminosity. *Harinder Pal Singh, M. K. Das, and J. N. Tandon*. **277**, 862, 21-E1 (1984)
- Depth of Origin of Solar Active Regions. *E. N. Parker*. **280**, 453, 53-E5 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Differential Rotation, Anisotropic Turbulent Magnetic Diffusivity, and Solar-Stellar Cycle Magnetic Parity. *Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu*. **280**, 865, 59-C3 (1984)
- The Sun as a Star: 1982 June 14-August 13. *R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime*. **280**, 873, 59-C11 (1984)
- The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. *A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston*. **282**, 776, 83-E3 (1984)
- Solar Luminosity Fluctuations and Active Region Photometry. *G. A. Chapman, A. D. Herzog, J. K. Lawrence, and J. C. Shelton*. **282**, L99, 85-E2 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Mode Transition between Steady and Oscillatory Dynamos as a Function of Dynamo Strength and Anisotropic Turbulent Magnetic Diffusivity. *Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu*. **283**, 870, 96-D5 (1984)
- Frequent Ultraviolet Brightenings Observed in a Solar Active Region with Solar Maximum Mission. *Jason G. Porter, Juri Toomre, and Katharine B. Gebbie*. **283**, 879, 96-D14 (1984)
- Coronal Extension of Flaring Region Magnetic Fields Inferred from High-Resolution Microwave and Type III Burst Observations. *P. Lantos, M. Pick, and M. R. Kundu*. **283**, L71, 97-D7 (1984)
- Solar Activity Cycle Variation of the K Corona. *R. Fisher and D. G. Sime*. **285**, 354, 113-F14 (1984)

Sun: Atmosphere

- Three-dimensional Magnetostatic Atmospheres: Magnetic Field with Vertically Oriented Tension Force. *B. C. Low*. **277**, 415, 15-D5 (1984)
- Gas Dynamics in the Impulsive Phase of Solar Flares. I. Thick-Target Heating by Nonthermal Electrons. *F. Nagai and A. Gordon Emslie*. **279**, 896, 47-E10 (1984)
- A Photometric Study of Heat Flow at the Solar Photosphere. *P. Foukal and L. Fowler*. **281**, 442, 65-F7 (1984)
- A Study of Solar Photospheric Limb-Darkening Variations. *L. D. Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce*. **283**, 426, 90-F4 (1984)
- A Conjecture concerning Thermodynamic Limits to Solar Atmospheric Heating. *Kenneth H. Schatten and Hans G. Mayr*. **283**, 853, 96-C2 (1984)
- Physical Conditions in the Cool Parts of Spicules. *Donald A. Landman*. **284**, 833, 108-B6 (1984)
- Effects of the Nonlocal Character of the Mean Intensity, Deviations from Radiative Equilibrium, and a Nongray Atmosphere on Oscillations in Stellar Envelopes. *H. A. Hill and J. D. Logan*. **285**, 386, 114-B5 (1984)
- Alfvénic Resonances on Solar Spicules. *Alphonse C. Sterling and Joseph V. Hollweg*. **285**, 843, 120-F1 (1984)
- A Photometric Study of Heat Flow at the Solar Photosphere: Erratum. *P. Foukal and L. Fowler*. **286**, 377, 126-A7 (1984) (Orig. paper in **281**, 442, 65-F7)
- A Case for Submergence of Magnetic Flux in a Solar Active Region. *Douglas Rabin, Ronald Moore, and M. J. Hagyard*. **287**, 404, 137-C12 (1984)
- The Origin of Spicules and Heating of the Lower Transition Region. *R. G. Athay*. **287**, 412, 137-D6 (1984)
- Apparent Solar Temperature Enhancement due to Large-Amplitude Waves. *W. Kalkofen, P. Ulmschneider, and F. Schmitz*. **287**, 952, 144-E11 (1984)

Sun: Atmospheric Motions

- Photoelectric Observations of Chromospheric Sunspot Oscillations. II. Propagation Characteristics. *Bruce W. Lites*. **277**, 874, 21-E13 (1984)
- Effects of Mass Motions on Solar Emission Measures Inferred from Transition-Region Emission Lines. *John T. Mariska*. **281**, 435, 65-E14 (1984)
- Detection of a Slowly Moving Coronal Transient Event. *R. Fisher and C. Garcia*. **282**, L35, 78-C9 (1984)
- Temporal Variations in the Solar Submillimeter Continuum. *C. Lindsey and C. Kaminski*. **282**, L103, 85-E5 (1984)
- On the Propagation of Acoustic Waves in a Radiating Fluid: Addendum. *Dimitri Mihalas and Barbara Weibel Mihalas*. **283**, 469, 91-B10 (1984) (Orig. paper in **273**, 355, 116-B6)
- Linear Models of Acoustic Waves in Sunspot Umbrae. *J. B. Gurman and J. W. Leibacher*. **283**, 859, 96-C8 (1984)
- Time-resolved Spectral Observations of Spicule Velocities at Several Heights. *S. Sirajul Hasan and Stephen L. Keil*. **283**, L75, 97-D11 (1984)
- Limits on Photospheric Doppler Signatures for Solar Giant Cells. *Herschel B. Snodgrass and Robert Howard*. **284**, 848, 108-C8 (1984)
- Dynamical Phenomena in Sunspots. I. Observing Procedures and Oscillatory Phenomena. *John H. Thomas, Lawrence E. Cram, and Alan H. Nye*. **285**, 368, 114-A1 (1984)
- Dynamical Phenomena in Sunspots. II. A Moving Magnetic Feature. *Alan H. Nye, John H. Thomas, and Lawrence E. Cram*. **285**, 381, 114-A14 (1984)
- Effects of the Nonlocal Character of the Mean Intensity, Deviations from Radiative Equilibrium, and a Nongray Atmosphere on Oscillations in Stellar Envelopes. *H. A. Hill and J. D. Logan*. **285**, 386, 114-B5 (1984)
- Techniques for Detecting Giant Cells Using Spatially Resolved Solar Velocity Data. *Timothy M. Brown and Peter A. Gilman*. **286**, 804, 131-G9 (1984)

Sun: Chromosphere

- Diamagnetic Propulsion and Energy Balance of Magnetic Elements in the Solar Chromosphere and Transition Region. *P. J. Cargill and G. W. Pneuman*. **276**, 369, 4-G1 (1984)
- Variations in the Solar Calcium K Line 1976-1982. *Stephen L. Keil and Simon P. Worden*. **276**, 766, 9-G6 (1984)
- Solar Limb Brightening at 820 Microns. *C. Lindsay, T. de Graauw, C. de Vries, and S. Lidholm*. **277**, 424, 15-D14 (1984)
- Photoelectric Observations of Chromospheric Sunspot Oscillations. II. Propagation Characteristics. *Bruce W. Lites*. **277**, 874, 21-E13 (1984)
- HRTS II EUV Observations of a Solar Ephemeral Region. *Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner*. **278**, 428, 28-E9 (1984)
- A Static Model of Chromospheric Heating in Solar Flares: Erratum. *Paul J. Ricchiazzi and Richard C. Canfield*. **279**, 463, 42-A11 (1984) (Orig. paper in **272**, 739, 109-G5)
- On the Origin of the Discrete Character of the Solar Disk Brightness in the 160 Nanometer Continuum. *B. Foing and R. M. Bonnet*. **279**, 848, 47-B2 (1984)
- A Dynamic Model for the Solar Transition Region. *S. K. Antiochos*. **280**, 416, 53-D12 (1984)
- Effects of Mass Motions on Solar Emission Measures Inferred from Transition-Region Emission Lines. *John T. Mariska*. **281**, 435, 65-E14 (1984)
- Observations of the Brightness Profile of the Sun in the 30-200 Micron Continuum. *C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley*. **281**, 862, 71-G11 (1984)
- High-Resolution Telescope and Spectrograph Observations of the Quiet Solar Chromosphere and Transition Zone. *K. P. Dere, J.-D. F. Bartoe, and G. E. Brueckner*. **281**, 870, 72-A6 (1984)
- The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. *A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston*. **282**, 776, 83-E3 (1984)
- Temporal Variations in the Solar Submillimeter Continuum. *C. Lindsey and C. Kaminski*. **282**, L103, 85-E5 (1984)
- High-Resolution Photography of the Solar Chromosphere. XIX. Flow Velocities along an Active Region Loop. *R. E. Loughhead and R. J. Bray*. **283**, 392, 90-C7 (1984)
- Time-resolved Spectral Observations of Spicule Velocities at Several Heights. *S. Sirajul Hasan and Stephen L. Keil*. **283**, L75, 97-D11 (1984)
- Physical Conditions in the Cool Parts of Spicules. *Donald A. Landman*. **284**, 833, 108-B6 (1984)
- Heating the Sun's Lower Transition Region with Fine-Scale Electric Currents. *Douglas Rabin and Ronald Moore*. **285**, 359, 113-G5 (1984)
- A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. *Todd A. Gunkler, Richard C. Canfield,*

- Loren W. Acton, and Alan L. Kiplinger. **285**, 835, 120-E7 (1984)
- Alfvénic Resonances on Solar Spicules. *Alphonse C. Sterling and Joseph V. Hollweg*. **285**, 843, 120-F1 (1984)
- The Energetics of Chromospheric Evaporation in Solar Flares. *E. Antonucci, A. H. Gabriel, and B. R. Dennis*. **287**, 917, 144-C4 (1984)
- Apparent Solar Temperature Enhancement due to Large-Amplitude Waves. *W. Kalkofen, P. Ulmschneider, and F. Schmitz*. **287**, 952, 144-E11 (1984)
- Sun: Corona**
- MHD Stability of Compressible Coronal Loops with Radiative Energy Loss. *Chang-Hyuk An*. **276**, 352, 4-E12 (1984)
- A Unified Theory of Electrodynamical Coupling in Coronal Magnetic Loops: The Coronal Heating Problem. *James A. Isonson*. **276**, 357, 4-F3 (1984)
- Condensation Modes in Magnetized Cylindrical Plasmas. *Chang-Hyuk An*. **276**, 755, 9-F9 (1984)
- Transient Behavior of a Flare-associated Solar Wind. I. Gas Dynamics in a Radial Open Field Region. *Fukuo Nagai*. **277**, 379, 15-A8 (1984)
- Resonances of Coronal Loops. *Joseph V. Hollweg*. **277**, 392, 15-B10 (1984)
- Generation of Coronal Electric Currents Due to Convective Motions on the Photosphere. II. Resonance and Phase-Mixing of Alfvén Waves. *Takashi Sakurai and Aleck Granik*. **277**, 404, 15-C8 (1984)
- HRTS II EUV Observations of a Solar Ephemeral Region. *Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner*. **278**, 428, 28-E9 (1984)
- Transient Behavior of Flare-associated Solar Wind II. Gas Dynamics in a Nonradial Open Field Region. *Fukuo Nagai*. **278**, 841, 35-A13 (1984)
- The Corona near the Time of the 1983 June 11 Total Solar Eclipse. *D. G. Sime, R. R. Fisher, M. K. McCabe, and D. L. Mickey*. **278**, L123, 36-C11 (1984)
- The Effects of a Multidensity Plasma on Ultraviolet Spectroscopic Electron Density Diagnostics. *G. A. Doschek*. **279**, 446, 41-G7 (1984)
- Elemental Composition of Solar Energetic Particles. *W. R. Cook, E. C. Stone, and R. E. Vogt*. **279**, 827, 46-G3 (1984)
- Associations between Coronal Mass Ejections and Metric Type II Bursts. *N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels*. **279**, 839, 47-A4 (1984)
- On the Origin of the Discrete Character of the Solar Disk Brightness in the 160 Nanometer Continuum. *B. Foing and R. M. Bonnet*. **279**, 848, 47-B2 (1984)
- On Coronal Oscillations. *B. Roberts, P. M. Edwin, and A. O. Benz*. **279**, 857, 47-B12 (1984)
- Fast-Mode Magnetohydrodynamic Waves in Coronal Holes and the Solar Wind. *Tor Flå, Shadia R. Habbal, Thomas E. Holzer, and Egil Leer*. **280**, 382, 53-B4 (1984)
- Radiative and Reconnection Instabilities: Filaments and Flares. *G. Van Hoven, T. Tachi, and R. S. Steinolfson*. **280**, 391, 53-B13 (1984)
- The Complex Coronal Transient of 1980 March 23. *Rainer M. E. Illing*. **280**, 399, 53-C7 (1984)
- Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. *R. R. Sharma and Loukas Vlahos*. **280**, 405, 53-D1 (1984)
- A Dynamic Model for the Solar Transition Region. *S. K. Antiochos*. **280**, 416, 53-D12 (1984)
- The Sun as a Star: 1982 June 14–August 13. *R. Fisher, M. McCabe, D. Mickey, P. Seagraves, and D. G. Sime*. **280**, 873, 59-C11 (1984)
- Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. *G. M. Mason, G. Gloeckler, and D. Hovestadt*. **280**, 902, 59-E14 (1984)
- Self-similar Magnetohydrodynamics. IV. The Physics of Coronal Transients. *B. C. Low*. **281**, 392, 65-B12 (1984)
- Magnetohydrodynamic Stability of Line-tied Coronal Arcades. II. Shearless Magnetic Fields. *Stefano Migliuolo, Peter J. Cargill, and Alan W. Hood*. **281**, 413, 65-D5 (1984)
- Comments on the MHD Stability of Coronal Plasmas with Line-Tying. *Chang-Hyuk An*. **281**, 419, 65-D11 (1984)
- Effects of Mass Motions on Solar Emission Measures Inferred from Transition-Region Emission Lines. *John T. Mariska*. **281**, 435, 65-E14 (1984)
- Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ^3He -rich Solar Energetic Particle Events. *B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk*. **281**, 458, 66-A1 (1984)
- Ionic Charge State Measurements during He^+ -rich Solar Particle Events. *D. Hovestadt, G. Gloeckler, B. Klecker, and M. Scholer*. **281**, 463, 66-A6 (1984)
- Thermal Ripples in a Resistive and Radiative Instability. *R. S. Steinolfson*. **281**, 854, 71-G3 (1984)
- The $\text{H}\alpha$ Spectral Signatures of Solar Flare Nonthermal Electrons. *Conductive Flux, and Coronal Pressure*. *Richard C. Canfield, Todd A. Gunkler, and Paul J. Ricchiazzi*. **282**, 296, 77-B3 (1984)
- Radio-Frequency Heating of the Coronal Plasma during Flares. *D. B. Melrose and G. A. Dulk*. **282**, 308, 77-C1 (1984)
- Analysis of Magnesium XI Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthausen, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark*. **282**, 784, 83-E13 (1984)
- Resonant Heating: An Interpretation of Coronal Loop Data. *Joseph V. Hollweg and Alphonse C. Sterling*. **282**, L31, 78-C6 (1984)
- Detection of a Slowly Moving Coronal Transient Event. *R. Fisher and C. Garcia*. **282**, L35, 78-C9 (1984)
- Combined Effect of Potential and Nonpotential Magnetic Fields on Equilibrium in Stellar Atmospheres. *Erast B. Gliner*. **283**, 363, 90-A1 (1984)
- Theoretical Model of the Solar Corona during Sunspot Minimum. I. Quasi-static Approximation. *Vladimir A. Osherovich, Israel Tzur, and Erast B. Gliner*. **284**, 412, 102-D7 (1984)
- The Effect of Line-Tying on the Radiative MHD Stability of Coronal Plasmas with Radial Pressure Profile. *Chang-Hyuk An*. **284**, 422, 102-E3 (1984)
- Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XIII Lines. *George L. Withbroe and John C. Raymond*. **285**, 347, 113-F7 (1984)
- Solar Activity Cycle Variation of the K Corona. *R. Fisher and D. G. Sime*. **285**, 354, 113-F14 (1984)
- Heating the Sun's Lower Transition Region with Fine-Scale Electric Currents. *Douglas Rabin and Ronald Moore*. **285**, 359, 113-G5 (1984)
- A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. *Todd A. Gunkler, Richard C. Canfield, Loren W. Acton, and Alan L. Kiplinger*. **285**, 835, 120-E7 (1984)
- On the Large-Scale Magnetostatic Coronal Structures and Their Stability. *B. C. Low*. **286**, 772, 131-E5 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. *Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek*. **286**, 787, 131-F6 (1984)
- Detailed Studies of the Dynamics and Energetics of Coronal Bullets. *Judith T. Karpen, Elaine S. Oran, and Jay P. Boris*. **287**, 396, 137-C4 (1984)
- The Origin of Spicules and Heating of the Lower Transition Region. *R. G. Athay*. **287**, 412, 137-D6 (1984)
- Rotational Characteristics of the White-Light Solar Coronae: 1965–1983. *R. Fisher and D. G. Sime*. **287**, 959, 144-F4 (1984)
- Sun: Eclipses**
- The Corona near the Time of the 1983 June 11 Total Solar Eclipse. *D. G. Sime, R. R. Fisher, M. K. McCabe, and D. L. Mickey*. **278**, L123, 36-C11 (1984)
- Sun: Faculae**
- A New Measurement of the Facular Contrast near the Solar Limb. *K. G. Libbrecht and J. R. Kuhn*. **277**, 889, 21-G1 (1984)
- Solar Luminosity Fluctuations and Active Region Photometry. *G. A. Chapman, A. D. Herzog, J. K. Lawrence, and J. C. Shelton*. **282**, L99, 85-E2 (1984)
- Sun: Flares**
- Magnetic Changes Observed in a Solar Flare. *Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane*. **276**, 379, 5-A1 (1984)
- Radiative Tearing: Magnetic Reconnection on a Fast Thermal Instability Time Scale. *R. S. Steinolfson and G. Van Hoven*. **276**, 391, 5-A13 (1984)
- A Study of the Evolution of Energetic Electrons in a Solar Flare. *Gordon D. Holman, M. R. Kundu, and B. R. Dennis*. **276**, 761, 9-G1 (1984)
- On the Rate of Energy Input in Thermal Solar Flares. *U. Feldman, G. A. Doschek, and D. L. McKenzie*. **276**, L53, 10-F10 (1984)
- Transient Behavior of a Flare-associated Solar Wind. I. Gas Dynamics in a Radial Open Field Region. *Fukuo Nagai*. **277**, 379, 15-A8 (1984)
- Interpretation of Microwave Active Region Structures Using SMM Soft X-Ray Observations. *K. T. Strong, C. E. Alissandrakis, and M. R. Kundu*. **277**, 865, 21-E4 (1984)
- Analysis of Solar Flare Gamma-Ray Events. *C. Kouveliotou, R. A. Treumann, and M. Scholer*. **278**, 420, 28-E1 (1984)
- Transient Behavior of Flare-associated Solar Wind. II. Gas Dynamics in a Nonradial Open Field Region. *Fukuo Nagai*. **278**, 841, 35-A13 (1984)
- Correlated Observations of Impulsive UV and Hard X-Ray Bursts in Solar Flares from the Solar Maximum Mission. *Chung-Chieh Cheng, Einar Tandberg-Hanssen, and I. E. Orwig*. **278**, 853, 35-B11 (1984)
- A Static Model of Chromospheric Heating in Solar Flares: Erratum.

Sun: Flares—Continued

- Paul J. Ricchiazzi and Richard C. Canfield. **279**, 463, 42-A11 (1984) (Orig. paper in **272**, 739, 109-G5)
- Elemental Composition of Solar Energetic Particles. W. R. Cook, E. C. Stone, and R. E. Vogt. **279**, 827, 46-G3 (1984)
- Associations between Coronal Mass Ejections and Metric Type II Bursts. N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels. **279**, 839, 47-A4 (1984)
- SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley. **279**, 866, 47-C8 (1984)
- The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis. **279**, 875, 47-D3 (1984)
- Microwave Signature of Thick-Target Electron Beams in Solar Flares. A. Gordon Emslie and Dean F. Smith. **279**, 882, 47-D10 (1984)
- Gas Dynamics in the Impulsive Phase of Solar Flares. I. Thick-Target Heating by Nonthermal Electrons. F. Nagai and A. Gordon Emslie. **279**, 896, 47-E10 (1984)
- Electron Density-Dependent Intensity Ratios of Highly Ionized Iron Lines: A Comparison of Theory and Experiment. B. C. Stratton, H. W. Moos, and M. Finkenthal. **279**, L31, 42-F3 (1984)
- Radiative and Reconnection Instabilities: Filaments and Flares. G. Van Hoven, T. Tachi, and R. S. Steinolfson. **280**, 391, 53-B13 (1984)
- Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. R. R. Sharma and Loukas Vlahos. **280**, 405, 53-D1 (1984)
- Coronal Transient Geometry. I. The Flare-associated Event of 1981 March 25. Richard R. Fisher and Richard H. Munro. **280**, 428, 53-E10 (1984)
- Polarization Evidence for the Isotropy of Electrons Responsible for the Production of 5–20 keV X-Rays in Solar Flares. Leonard J. Tramiel, Gary A. Chanan, and R. Novick. **280**, 440, 53-F8 (1984)
- Beam-Return Current Systems in Solar Flares. D. S. Spicer and R. N. Sudan. **280**, 448, 53-G2 (1984)
- The Energy Relation between Hard X-Ray and O v Emission in Solar Flares. A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer. **280**, 457, 53-G11 (1984)
- Decimetric Gyrosynchrotron Emission during a Solar Flare. David A. Batchelor, Arnold O. Benz, and Herbert J. Wiele. **280**, 879, 59-D3 (1984)
- Flares in Hale 17760: Magnetic Transients in the 1981 July 27 Flare. A. Patterson. **280**, 884, 59-D8 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo. **280**, 887, 59-D12 (1984)
- A High-Resolution Study of the Isotopes of Solar Flare Nuclei. R. A. Mewaldt, J. D. Spalding, and E. C. Stone. **280**, 892, 59-E4 (1984)
- Temporal Variations of Nucleonic Abundances in Solar Flare Energetic Particle Events. II. Evidence for Large-Scale Shock Acceleration. G. M. Mason, G. Gloeckler, and D. Hovestadt. **280**, 902, 59-E14 (1984)
- Direct Measurement of the Increase in Altitude of the Soft X-Ray Emission Region during a Solar Flare. J. F. Seely and U. Feldman. **280**, L59, 60-E10 (1984)
- A Skylab Flare Associated with a Hard X-Ray Burst. Kenneth Widing and Eijiro Hiei. **281**, 426, 65-E4 (1984)
- Direct Determination of the Ionic Charge Distribution of Helium and Iron in the ³He-rich Solar Energetic Particle Events. B. Klecker, D. Hovestadt, G. Gloeckler, F. M. Ipavich, M. Scholer, C. Y. Fan, and L. A. Fisk. **281**, 458, 66-A1 (1984)
- Ionic Charge State Measurements during He⁺-rich Solar Particle Events. D. Hovestadt, G. Gloeckler, B. Klecker, and M. Scholer. **281**, 463, 66-A6 (1984)
- Evidence for Magnetic Field Rearrangement in a Solar Flare. Harold Zirin. **281**, 884, 72-B6 (1984)
- Hard X-Ray Imaging of a Solar Two-Ribbon Flare on 1981 August 21. T. Takakura, K. Ohki, N. Nitta, and J. L. Wang. **281**, L51, 67-A5 (1984)
- Chromospheric Evaporation Velocities in Solar Flares. George H. Fisher, Richard C. Canfield, and Alexander N. McClymont. **281**, L79, 73-B13 (1984)
- The H α Spectral Signatures of Solar Flare Nonthermal Electrons, Conductive Flux, and Coronal Pressure. Richard C. Canfield, Todd A. Gunkler, and Paul J. Ricchiazzi. **282**, 296, 77-B3 (1984)
- Radio-Frequency Heating of the Coronal Plasma during Flares. D. B. Melrose and G. A. Dulk. **282**, 308, 77-C1 (1984)
- Solar Flare Iron K α Emission Associated with a Hard X-Ray Burst. Katsuo Tanaka, Tetsuya Watanabe, and Nariaki Nitta. **282**, 793, 83-F8 (1984)
- Survey of He⁺/He²⁺ Abundance Ratios in Energetic Particle Events. D. Hovestadt, B. Klecker, G. Gloeckler, F. M. Ipavich, and M. Scholer. **282**, L39, 78-C12 (1984)
- Shock Acceleration of Nuclei and Electrons in the Heliosphere beyond 24 AU. K. R. Pyle, J. A. Simpson, A. Barnes, and J. D. Mihalov. **282**, L107, 85-E9 (1984)
- On Some Properties of Force-free Magnetic Fields in Infinite Regions of Space. J. J. Ahl. **283**, 349, 89-G1 (1984)
- Flares in Hale 17760: Simultaneous Microwave Spectra and Images of the Flare of 1981 July 27. Arie Kattenberg. **283**, 398, 90-C13 (1984)
- The Possibility of Steady State Nonionization Equilibrium Conditions in Soft X-Ray Flare Plasmas. G. A. Doschek. **283**, 404, 90-D5 (1984)
- Solar Hard X-Ray Microflares. R. P. Lin, R. A. Schwartz, S. R. Kane, R. M. Pelling, and K. C. Hurley. **283**, 421, 90-E13 (1984)
- Electron-rich Particle Events and the Production of Gamma-Rays by Solar Flares. Paul Evenson, Peter Meyer, Shohei Yanagita, and David J. Forrest. **283**, 439, 90-G5 (1984)
- Coronal Extension of Flaring Region Magnetic Fields Inferred from High-Resolution Microwave and Type III Burst Observations. P. Lantos, M. Pick, and M. R. Kundu. **283**, L71, 97-D7 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara. **284**, 827, 108-A11 (1984)
- The Impulsive Phase of a Solar Limb Flare. G. M. Simnett and K. T. Strong. **284**, 839, 108-B13 (1984)
- A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. Todd A. Gunkler, Richard C. Canfield, Loren W. Acton, and Alan L. Kiplinger. **285**, 835, 120-E7 (1984)
- The Relation of Electron Temperature to Emission Measure and Limits of Increase in Emission Measure in Soft X-Ray Flares. Richard E. Denton and Uri Feldman. **286**, 359, 125-G2 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek. **286**, 787, 131-F6 (1984)
- The Energetics of Chromospheric Evaporation in Solar Flares. E. Antonucci, A. H. Gabriel, and B. R. Dennis. **287**, 917, 144-C4 (1984)
- Fast Variations in High-Energy X-Rays from Solar Flares and Their Constraints on Nonthermal Models. Alan L. Kiplinger, B. R. Dennis, K. J. Frost, and L. E. Orwig. **287**, L105, 145-F13 (1984)
- Sun: General**
- The Effect of Rotation and the Magnetic Field on Solar Luminosity. Harinder Pal Singh, M. K. Das, and J. N. Tandon. **277**, 862, 21-E1 (1984)
- Mass Loss from the Proto-Sun: Formation and Evolution of the Solar Nebula. B. M. P. Trivedi. **281**, 375, 65-A9 (1984)
- Color Anomalies and Starspots in Hyades Dwarfs. Bruce Campbell. **283**, 209, 88-C9 (1984)
- A Study of Solar Photospheric Limb-Darkening Variations. L. D. Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce. **283**, 426, 90-F4 (1984)
- Spectroscopic Evidence for Starspots in the G Dwarf HD 1835. Bruce Campbell and Roger Cayrel. **283**, L17, 91-F5 (1984)
- Limits on a Stochastic Gravitational Wave Background from Observations of Terrestrial and Solar Oscillations. S. P. Boughn and J. R. Kuhn. **286**, 387, 127-C9 (1984)
- Energy Distributions for 12 Solar-Type Stars and Synthetic UVB Photometry of the Sun. Benjamin J. Taylor. **54**, 167, 3-B1 (1984) (Abstr. in **275**, 930, 147-F3)
- Sun: Granulation**
- A Photometric Study of Heat Flow at the Solar Photosphere. P. Foukal and L. Fowler. **281**, 442, 65-F7 (1984)
- A Photometric Study of Heat Flow at the Solar Photosphere: Erratum. P. Foukal and L. Fowler. **286**, 377, 126-A7 (1984) (Orig. paper in **281**, 442, 65-F7)
- Sun: Interior**
- The Role of Flux Ejection in Stellar Dynamos. E. N. Parker. **276**, 341, 4-E1 (1984)
- Resonant Three-Wave Interactions of Solar g-Modes. D. B. Guenther and P. Demarque. **277**, L17, 16-B3 (1984)
- Meridional Circulation in Rotating Stars. VII. The Effects of Chemical Inhomogeneities. Monique Tassoul and Jean-Louis Tassoul. **279**, 384, 41-B9 (1984)
- The Overshoot Region at the Bottom of the Solar Convection Zone. J. H. M. M. Schmitt, R. Rosner, and H. U. Bohn. **282**, 316, 77-C9 (1984)
- Sun: Limb Darkening**
- Solar Limb Brightening at 820 Microns. C. Lindsay, T. de Grauw, C. de Vries, and S. Lidholm. **277**, 424, 15-D14 (1984)
- A New Measurement of the Facular Contrast near the Solar Limb. K. G. Libbrecht and J. R. Kuhn. **277**, 889, 21-G1 (1984)
- Observations of the Brightness Profile of the Sun in the 30–200 Micron

- Continuum. C. Lindsey, E. E. Becklin, J. T. Jeffries, F. Q. Orrall, M. W. Werner, and Ian Gatley. **281**, 862, 71-G11 (1984)
- A Study of Solar Photospheric Limb-Darkening Variations. L. D. Petro, P. V. Foukal, W. A. Rosen, R. L. Kurucz, and A. K. Pierce. **283**, 426, 90-F4 (1984)
- Sun: Magnetic Fields**
- A Unified Theory of Electrodynamical Coupling in Coronal Magnetic Loops: The Coronal Heating Problem. James A. Ionson. **276**, 357, 4-F3 (1984)
- Magnetic Changes Observed in a Solar Flare. Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane. **276**, 379, 5-A1 (1984)
- Generation of Coronal Electric Currents Due to Convective Motions on the Photosphere. II. Resonance and Phase-Mixing of Alfvén Waves. Takashi Sakurai and Aleck Granik. **277**, 404, 15-C8 (1984)
- Three-dimensional Magnetostatic Atmospheres: Magnetic Field with Vertically Oriented Tension Force. B. C. Low. **277**, 415, 15-D5 (1984)
- Oscillating Dynamo Magnetic Field in the Presence of an External Nondynamo Field. The Influence of a Solar Primordial Field. D. W. Boyer and E. H. Levy. **277**, 848, 21-D1 (1984)
- The Effect of Rotation and the Magnetic Field on Solar Luminosity. Harinder Pal Singh, M. K. Das, and J. N. Tandon. **277**, 862, 21-E1 (1984)
- On the Topological Stability of Magnetostatic Equilibria. K. C. Tsinganos, J. Distler, and R. Rosner. **278**, 409, 28-D4 (1984)
- On the Origin of the Discrete Character of the Solar Disk Brightness in the 160 Nanometer Continuum. B. Foing and R. M. Bonnet. **279**, 848, 47-B2 (1984)
- Depth of Origin of Solar Active Regions. E. N. Parker. **280**, 453, 53-E5 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Differential Rotation, Anisotropic Turbulent Magnetic Diffusivity, and Solar-Stellar Cycle Magnetic Parity. Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu. **280**, 865, 59-C3 (1984)
- Flares in Hale 17760: Magnetic Transients in the 1981 July 27 Flare. A. Patterson. **280**, 884, 59-D8 (1984)
- Magnetohydrodynamic Stability of Line-tied Coronal Arcades. II. Shearless Magnetic Fields. Stefano Migliuolo, Peter J. Cargill, and Alan W. Hood. **281**, 413, 65-D5 (1984)
- The Effect of Closed Boundary Conditions on a Stationary Dynamo. Arnab Rai Choudhuri. **281**, 846, 71-F9 (1984)
- Evidence for Magnetic Field Rearrangement in a Solar Flare. Harold Zirin. **281**, 884, 72-B6 (1984)
- The Thermal Instability in a Sheared Magnetic Field: Filament Condensation with Anisotropic Heat Conduction. G. Van Hoven and Y. Mok. **282**, 267, 76-G1 (1984)
- Propagation of Axisymmetric Disturbances on a Twisted Magnetic Flux Tube. T. J. Bogdan. **282**, 769, 83-D10 (1984)
- Resonant Heating: An Interpretation of Coronal Loop Data. Joseph V. Hollweg and Alphonse C. Sterling. **282**, L31, 78-C6 (1984)
- On Some Properties of Force-free Magnetic Fields in Infinite Regions of Space. J. J. Aly. **283**, 349, 89-G1 (1984)
- Three-dimensional Structures of Two Solar Active Regions from VLA Observations at 2, 6, and 20 Centimeter Wavelengths. R. K. Shevgaonkar and M. R. Kundu. **283**, 413, 90-D14 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Solar and Stellar Cycle North-South Hemispheric Parity Selection Mechanism and Turbulent Magnetic Diffusivity. Hirokazu Yoshimura, Fei Wu, and Zhengzhi Wang. **285**, 325, 113-D9 (1984)
- Dynamical Phenomena in Sunspots. II. A Moving Magnetic Feature. Alan H. Nye, John H. Thomas, and Lawrence E. Cram. **285**, 381, 114-A14 (1984)
- Convective Instability in a Solar Flux Tube. I. Nonlinear Calculations for an Adiabatic Inviscid Fluid. S. Sirajul Hasan. **285**, 851, 120-F9 (1984)
- On the Large-Scale Magnetostatic Coronal Structures and Their Stability. B. C. Low. **286**, 772, 131-E5 (1984)
- A Case for Submergence of Magnetic Flux in a Solar Active Region. Douglas Rabin, Ronald Moore, and M. J. Hagyard. **287**, 404, 137-C12 (1984)
- Sun: Oscillations**
- Evidence for Global Oscillations in the K2 Dwarf Epsilon Eridani. R. W. Noyes, S. L. Baliunas, E. Belserene, D. K. Duncan, J. Horne, and L. Widrow. **285**, L23, 114-G8 (1984)
- Sun: Plages**
- The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston. **282**, 776, 83-E3 (1984)
- Sun: Prominences**
- Condensation Modes in Magnetized Cylindrical Plasmas. Chang-Hyuk An. **276**, 755, 9-F9 (1984)
- MHD Stability of Sheet Equilibria Relevant for Quiescent Prominences. J. Galindo-Trejo and K. Schindler. **277**, 422, 15-D12 (1984)
- Physical Conditions in the Cool Parts of Prominences. II. The Mg Triplet Lines. Donald A. Landman. **279**, 438, 41-F13 (1984)
- The Thermal Instability in a Sheared Magnetic Field: Filament Condensation with Anisotropic Heat Conduction. G. Van Hoven and Y. Mok. **282**, 267, 76-G1 (1984)
- High-Resolution Photography of the Solar Chromosphere. XIX. Flow Velocities along an Active Region Loop. R. E. Loughhead and R. J. Bray. **283**, 392, 90-C7 (1984)
- Sun: Radio Radiation**
- Magnetic Changes Observed in a Solar Flare. Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane. **276**, 379, 5-A1 (1984)
- A Study of the Evolution of Energetic Electrons in a Solar Flare. Gordon D. Holman, M. R. Kundu, and B. R. Dennis. **276**, 761, 9-G1 (1984)
- Interpretation of Microwave Active Region Structures Using SMM Soft X-Ray Observations. K. T. Strong, C. E. Alissandrakis, and M. R. Kundu. **277**, 865, 21-E4 (1984)
- VLA Observations of Fine Structures in a Solar Active Region at 6 Centimeter Wavelength. D. McConnell and M. R. Kundu. **279**, 421, 41-E4 (1984)
- Very Large Array Observations of Solar Active Regions. IV. Structure and Evolution of Radio Bursts from 20 Centimeter Loops. Robert F. Willson and Kenneth R. Lang. **279**, 427, 41-E10 (1984)
- Associations between Coronal Mass Ejections and Metric Type II Bursts. N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels. **279**, 839, 47-A4 (1984)
- The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis. **279**, 875, 47-D3 (1984)
- Microwave Signature of Thick-Target Electron Beams in Solar Flares. A. Gordon Emslie and Dean F. Smith. **279**, 882, 47-D10 (1984)
- Comparative Study of the Loss Cone-driven Instabilities in the Low Solar Corona. R. R. Sharma and Loukas Vlahos. **280**, 405, 53-D1 (1984)
- Decimetric Gyrosynchrotron Emission during a Solar Flare. David A. Batchelor, Arnold O. Benz, and Herbert J. Wiehl. **280**, 879, 59-D3 (1984)
- Radio-Frequency Heating of the Coronal Plasma during Flares. D. B. Melrose and G. A. Dulk. **282**, 308, 77-C1 (1984)
- Type II Solar Radio Bursts, Interplanetary Shocks, and Energetic Particle Events. H. V. Cane and R. G. Stone. **282**, 339, 77-E4 (1984)
- Flares in Hale 17760: Simultaneous Microwave Spectra and Images of the Flare of 1981 July 27. Arie Kattenberg. **283**, 398, 90-C13 (1984)
- Three-dimensional Structures of Two Solar Active Regions from VLA Observations at 2, 6, and 20 Centimeter Wavelengths. R. K. Shevgaonkar and M. R. Kundu. **283**, 413, 90-D14 (1984)
- Coronal Extension of Flaring Region Magnetic Fields Inferred from High-Resolution Microwave and Type III Burst Observations. P. Lantos, M. Pick, and M. R. Kundu. **283**, L71, 97-D7 (1984)
- Sun: Rotation**
- Is Stellar Differential Rotation Observable? Barry LaBonte. **276**, 335, 4-D9 (1984)
- The Effect of Rotation and the Magnetic Field on Solar Luminosity. Harinder Pal Singh, M. K. Das, and J. N. Tandon. **277**, 862, 21-E1 (1984)
- On the Rotation Rate of Polar Features in the Sun. B. R. Durney, S. L. Keil, and D. M. Lytle. **281**, 455, 65-G10 (1984)
- Rotation of the Sun Measured from Mount Wilson White-Light Images. Robert Howard, Peter A. Gilman, and Pamela I. Gilman. **283**, 373, 90-A11 (1984)
- Variations in Solar Rotation with the Sunspot Cycle. Peter A. Gilman and Robert Howard. **283**, 385, 90-B14 (1984)
- Linear Astrophysical Dynamos in Rotating Spheres: Mode Transition between Steady and Oscillatory Dynamos as a Function of Dynamo Strength and Anisotropic Turbulent Magnetic Diffusivity. Hirokazu Yoshimura, Zhengzhi Wang, and Fei Wu. **283**, 870, 96-D5 (1984)
- Meridional Circulation in Rotating Stars. VIII. The Solar Spin-down Problem. Monique Tassoul and Jean-Louis Tassoul. **286**, 350, 125-F7 (1984)
- Rotational Characteristics of the White-Light Solar Corona: 1965-1983. R. Fisher and D. G. Sime. **287**, 959, 144-F4 (1984)
- Sun: Solar Wind**
- Transient Behavior of a Flare-associated Solar Wind. I. Gas Dynamics in a Radial Open Field Region. Fukuo Nagai. **277**, 379, 15-A8 (1984)
- Transient Behavior of Flare-associated Solar Wind. II. Gas Dynamics in a Nonradial Open Field Region. Fukuo Nagai. **278**, 841, 35-A13 (1984)

Sun: Solar Wind-Continued

- Integral Radial Cosmic Ray Gradients in the Solar System from 1972 to 1982. *J. A. Lockwood and W. R. Webber*. **279**, 151, 38-E13 (1984)
- Elemental Composition of Solar Energetic Particles. *W. R. Cook, E. C. Stone, and R. E. Vogt*. **279**, 827, 46-G3 (1984)
- Associations between Coronal Mass Ejections and Metric Type II Bursts. *N. R. Sheeley, Jr., R. T. Stewart, R. D. Robinson, R. A. Howard, M. J. Koomen, and D. J. Michels*. **279**, 839, 47-A4 (1984)
- Colliding Winds: Interaction Regions with Strong Heat Conduction. *James N. Imamura and Roger A. Chevalier*. **280**, 313, 52-D5 (1984)
- Alfvén Waves in the Solar Wind in Association with Solar Energetic Particles: Sunspot Umbral Origin? *D. J. Mullan and A. J. Owens*. **280**, 346, 52-E10 (1984)
- Fast-Mode Magnetohydrodynamic Waves in Coronal Holes and the Solar Wind. *Tor Flå, Shadia R. Habbal, Thomas E. Holzer, and Egil Leer*. **280**, 382, 53-B4 (1984)
- The Far Reaches of the Solar Wind: Pioneer 10 and Pioneer 11 Plasma Results. *Susan E. Kayser, Aaron Barnes, and John D. Mihalov*. **285**, 339, 113-E13 (1984)
- Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XII Lines. *George L. Withbroe and John C. Raymond*. **285**, 347, 113-F7 (1984)
- Numerical Investigation of Fluid Models with Full Electron and Proton Thermal Conduction Equations for the Quiet Solar Wind. *S. Cuperman, I. Tzur, and M. Dryer*. **286**, 763, 131-D10 (1984)
- Sun: Spectra**
- Variations in the Solar Calcium K Line 1976-1982. *Stephen L. Keil and Simon P. Worden*. **276**, 766, 9-G6 (1984)
- HRTS II EUV Observations of a Solar Ephemeral Region. *Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner*. **278**, 428, 28-E9 (1984)
- Physical Conditions in the Cool Parts of Prominences. II. The Mg Triplet Lines. *Donald A. Landman*. **279**, 438, 41-F13 (1984)
- The Energy Relation between Hard X-Ray and O v Emission in Solar Flares. *A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer*. **280**, 457, 53-G11 (1984)
- Observational Evidence for Non-Maxwellian Electron Energy Distributions in the Solar Transition Region. *P. L. Dufton, A. E. Kingston, and F. P. Keenan*. **280**, L35, 54-E11 (1984)
- On the Rotation Rate of Polar Features in the Sun. *B. R. Durney, S. L. Keil, and D. M. Lytle*. **281**, 455, 65-G10 (1984)
- High-Resolution Telescope and Spectrograph Observations of the Quiet Solar Chromosphere and Transition Zone. *K. P. Dere, J.-D. F. Bartoe, and G. E. Brueckner*. **281**, 870, 72-A6 (1984)
- The Sun As a Star: Three-Component Analysis of Chromospheric Variability in the Calcium K Line. *A. Skumanich, J. L. Lean, O. R. White, and W. C. Livingston*. **282**, 776, 83-E3 (1984)
- Analysis of Magnesium XI Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthaus, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark*. **282**, 784, 83-E13 (1984)
- Solar Flare Iron K α Emission Associated with a Hard X-Ray Burst. *Katsuo Tanaka, Tetsuya Watanabe, and Nariaki Nitta*. **282**, 793, 83-F8 (1984)
- Frequent Ultraviolet Brightenings Observed in a Solar Active Region with Solar Maximum Mission. *Jason G. Porter, Juri Toomre, and Katharine B. Gebbie*. **283**, 879, 96-D14 (1984)
- Gravitation in the Weak-Field Limit. *Herbert J. Rood*. **284**, 407, 102-D2 (1984)
- Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XII Lines. *George L. Withbroe and John C. Raymond*. **285**, 347, 113-F7 (1984)
- Dynamical Phenomena in Sunspots. I. Observing Procedures and Oscillatory Phenomena. *John H. Thomas, Lawrence E. Cram, and Alan H. Nye*. **285**, 368, 114-A1 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. *Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek*. **286**, 787, 131-F6 (1984)
- On Bowen Enhancement of the N III Spectrum under Solar and Nebulae Conditions. *S. O. Kastner and A. K. Bhatia*. **287**, 945, 144-E4 (1984)
- A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. *G. A. Doschek and R. D. Cowan*. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- Sun: Spectroheliograms**
- A Skylab Flare Associated with a Hard X-Ray Burst. *Kenneth Widing and Eijiro Hiei*. **281**, 426, 65-E4 (1984)
- Sun: Sunspots**
- Photoelectric Observations of Chromospheric Sunspot Oscillations. II. Propagation Characteristics. *Bruce W. Lites*. **277**, 874, 21-E13 (1984)

- Induced Atomic Orientation, An Efficient Mechanism for Magnetic Circular Polarization. *James C. Kemp, Joseph H. Macek, and Frederick W. Nehring*. **278**, 863, 35-C9 (1984)
- VLA Observations of Fine Structures in a Solar Active Region at 6 Centimeter Wavelength. *D. McConnell and M. R. Kundu*. **279**, 421, 41-E4 (1984)
- Alfvén Waves in the Solar Wind in Association with Solar Energetic Particles: Sunspot Umbral Origin? *D. J. Mullan and A. J. Owens*. **280**, 346, 52-E10 (1984)
- Solar Luminosity Fluctuations and Active Region Photometry. *G. A. Chapman, A. D. Herzog, J. K. Lawrence, and J. C. Shelton*. **282**, L99, 85-E2 (1984)
- Rotation of the Sun Measured from Mount Wilson White-Light Images. *Robert Howard, Peter A. Gilman, and Pamela I. Gilman*. **283**, 373, 90-A11 (1984)
- Variations in Solar Rotation with the Sunspot Cycle. *Peter A. Gilman and Robert Howard*. **283**, 385, 90-B14 (1984)
- Linear Models of Acoustic Waves in Sunspot Umbrae. *J. B. Gurman and J. W. Leibacher*. **283**, 859, 96-C8 (1984)
- Spectroscopic Evidence for Starspots in the G Dwarf HD 1835. *Bruce Campbell and Roger Cayrel*. **283**, L17, 91-F5 (1984)
- Theoretical Model of the Solar Corona during Sunspot Minimum. I. Quasi-static Approximation. *Vladimir A. Osherovich, Israel Tzur, and Erast B. Gliner*. **284**, 412, 102-D7 (1984)
- Dynamical Phenomena in Sunspots. I. Observing Procedures and Oscillatory Phenomena. *John H. Thomas, Lawrence E. Cram, and Alan H. Nye*. **285**, 368, 114-A1 (1984)
- Dynamical Phenomena in Sunspots. II. A Moving Magnetic Feature. *Alan H. Nye, John H. Thomas, and Lawrence E. Cram*. **285**, 381, 114-A14 (1984)
- Convective Instability in a Solar Flux Tube. I. Nonlinear Calculations for an Adiabatic Inviscid Fluid. *S. Sirajul Hasan*. **285**, 851, 120-F9 (1984)
- Sun: X-Rays**
- Magnetic Changes Observed in a Solar Flare. *Ronald L. Moore, Gordon J. Hurford, Harrison P. Jones, and Sharad R. Kane*. **276**, 379, 5-A1 (1984)
- A Study of the Evolution of Energetic Electrons in a Solar Flare. *Gordon D. Holman, M. R. Kundu, and B. R. Dennis*. **276**, 761, 9-G1 (1984)
- On the Rate of Energy Input in Thermal Solar Flares. *U. Feldman, G. A. Doschek, and D. L. McKenzie*. **276**, L53, 10-F10 (1984)
- Interpretation of Microwave Active Region Structures Using SMM Soft X-Ray Observations. *K. T. Strong, C. E. Alissandrakis, and M. R. Kundu*. **277**, 865, 21-E4 (1984)
- Correlated Observations of Impulsive UV and Hard X-Ray Bursts in Solar Flares from the Solar Maximum Mission. *Chung-Chieh Cheng, Einar Tandberg-Hanssen, and L. E. Orwig*. **278**, 853, 35-B11 (1984)
- SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. *A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley*. **279**, 866, 47-C8 (1984)
- The Relative Timing of Microwaves and Hard X-Rays in Solar Flares. *M. E. Cornell, G. J. Hurford, A. L. Kiplinger, and B. R. Dennis*. **279**, 875, 47-D3 (1984)
- Polarization Evidence for the Isotropy of Electrons Responsible for the Production of 5-20 keV X-Rays in Solar Flares. *Leonard J. Tramiel, Gary A. Chanan, and R. Novick*. **280**, 440, 53-F8 (1984)
- The Energy Relation between Hard X-Ray and O v Emission in Solar Flares. *A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer*. **280**, 457, 53-G11 (1984)
- Decimetric Gyrosynchrotron Emission during a Solar Flare. *David A. Batchelor, Arnold O. Benz, and Herbert J. Wiehl*. **280**, 879, 59-D3 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the Hinotori Spacecraft. *S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo*. **280**, 887, 59-D12 (1984)
- Direct Measurement of the Increase in Altitude of the Soft X-Ray Emission Region during a Solar Flare. *J. F. Seely and U. Feldman*. **280**, L59, 60-E10 (1984)
- A Skylab Flare Associated with a Hard X-Ray Burst. *Kenneth Widing and Eijiro Hiei*. **281**, 426, 65-E4 (1984)
- Hard X-Ray Imaging of a Solar Two-Ribbon Flare on 1981 August 21. *T. Takakura, K. Ohki, N. Nitta, and J. L. Wang*. **281**, L51, 67-A5 (1984)
- Chromospheric Evaporation Velocities in Solar Flares. *George H. Fisher, Richard C. Canfield, and Alexander N. McClymont*. **281**, L79, 73-B13 (1984)
- Analysis of Magnesium XI Line Profiles from Solar Active Regions. *R. L. Blake, R. D. Cowan, H. Felthaus, E. E. Fenimore, M. P.*

- Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark. **282**, 784, 83-E13 (1984)
- Solar Flare Iron K α Emission Associated with a Hard X-Ray Burst. Katsuo Tanaka, Tetsuya Watanabe, and Nariaki Nitta. **282**, 793, 83-F8 (1984)
- Resonant Heating: An Interpretation of Coronal Loop Data. Joseph V. Hollweg and Alphonse C. Sterling. **282**, L31, 78-C6 (1984)
- The Possibility of Steady State Nonionization Equilibrium Conditions in Soft X-Ray Flare Plasmas. G. A. Doschek. **283**, 404, 90-D5 (1984)
- Solar Hard X-Ray Microflares. R. P. Lin, R. A. Schwartz, S. R. Kane, R. M. Pelling, and K. C. Hurley. **283**, 421, 90-E13 (1984)
- Hard X-Ray Imaging Observations of Solar Hot Thermal Flares with the HINOTORI Spacecraft. S. Tsuneta, N. Nitta, K. Ohki, T. Takakura, K. Tanaka, K. Makishima, T. Murakami, M. Oda, and Y. Ogawara. **284**, 827, 108-A11 (1984)
- The Impulsive Phase of a Solar Limb Flare. G. M. Simnett and K. T. Strong. **284**, 839, 108-B13 (1984)
- A Consistent Picture of Coronal and Chromospheric Processes in a Well-observed Solar Flare. Todd A. Gunkler, Richard C. Canfield, Loren W. Acton, and Alan L. Kiplinger. **285**, 835, 120-E7 (1984)
- The Relation of Electron Temperature to Emission Measure and Limits of Increase in Emission Measure in Soft X-Ray Flares. Richard E. Denton and Uri Feldman. **286**, 359, 125-G2 (1984)
- Numerical Simulations of Loops Heated to Solar Flare Temperatures. III. Asymmetrical Heating. Chung-Chieh Cheng, Judith T. Karpen, and George A. Doschek. **286**, 787, 131-F6 (1984)
- The Energetics of Chromospheric Evaporation in Solar Flares. E. Antonucci, A. H. Gabriel, and B. R. Dennis. **287**, 917, 144-C4 (1984)
- Fast Variations in High-Energy X-Rays from Solar Flares and Their Constraints on Nonthermal Models. Alan L. Kiplinger, B. R. Dennis, K. J. Frost, and L. E. Orwig. **287**, L105, 145-F13 (1984)
- Symbiotic Stars: see Stars: Combination Spectra
- 3° Cosmic Radiation: see Cosmic Background Radiation**
- Transition Probabilities**
- Infrared and Far-Infrared Transition Frequencies for the CH₂ Radical. Trevor J. Sears, A. R. W. McKellar, P. R. Bunker, K. M. Evenson, and J. M. Brown. **276**, 399, 5-B7 (1984)
- Calculations of Transition Probabilities for Forbidden Lines in the 3d⁷ Ground Configurations of Co III and Ni IV. J. E. Hansen, A. J. J. Raassen, and P. H. M. Uylings. **277**, 435, 15-E13 (1984)
- Interstellar O₂. II. VUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman. **277**, 569, 18-C5 (1984)
- Electron Excitation Rate Coefficients for Transitions from the 1s² 1S Ground State to the 1s2s 1³S and 1s2p 1³P^o Excited States of Helium. K. M. Aggarwal, A. E. Kingston, and M. R. C. McDowell. **278**, 874, 35-D6 (1984)
- Collisional Excitation Rate Coefficients for Fe XI. Jieh-Shan Wang, Arny Marotta, and Raju U. Datla. **279**, 460, 42-A8 (1984)
- Bound-State Decay of Rhenium-187. R. D. Williams, W. A. Fowler, and S. E. Koonin. **281**, 363, 64-G11 (1984)
- The Radiative Lifetime of the ³S₂ Metastable Level of O⁺⁺. B. Carol Johnson, Peter L. Smith, and R. D. Knight. **281**, 477, 65-B6 (1984)
- Oscillator Strengths and Collision Strengths for S III. Y. K. Ho and Ronald J. W. Henry. **282**, 816, 84-A6 (1984)
- Collision Strengths for λ 1199 and λ 1729 of S III. Y. K. Ho and Ronald J. W. Henry. **284**, 435, 102-F2 (1984)
- Comment on "Scaling Laws for Hydrogen-like Atoms in Magnetic Fields of Arbitrary Strength". H. Herold, H. Ruder, and G. Wunner. **285**, 870, 121-A1 (1984)
- Quantal Calculations of Charge Transfer in Collisions between N v and Atomic Hydrogen. C. A. Feickert, R. J. Blint, G. T. Surratt, and W. D. Watson. **286**, 371, 126-A1 (1984)
- Oscillator Strengths of the C₂ A¹ Π_u -X¹ Σ_g^+ Phillips System. Sumner P. Davis, Wm. Hayden Smith, James W. Brault, Ruben Pecnyer, and Jeremy Wagner. **287**, 455, 137-G7 (1984)
- Electron Impact Excitation Rates for Fine-Structure Transitions in Ne v and Si IX: An R-Matrix Approach. K. M. Aggarwal. **54**, 1, 1-A2 (1984) (Abstr. in **275**, 926, 147-E13)
- Inner Shell Excitation of Lithium-like Ions. Stephen J. Goett, Douglas H. Sampson, and Robert E. H. Clark. **54**, 115, 2-E2 (1984) (Abstr. in **275**, 928, 147-F1)
- High Energy Collision Strengths and Limits of Excitation of Hydrogenic Ions by Electron Impact. D. H. Oza. **54**, 395, 7-B8 (1984) (Abstr. in **277**, 907, 22-A8)
- Electron Impact Excitation of Forbidden Transitions in Mg II. K. M. Aggarwal. **56**, 303, 27-A13 (1984) (Abstr. in **285**, 874, 121-A5)
- T Tauri Stars: see Stars: Pre-Main-Sequence**
- Turbulence**
- A Convective Model for Turbulent Mixing in Rotating Convection Zones. David H. Hathaway. **276**, 316, 4-C4 (1984)
- Turbulent Velocity Structure in Interstellar Clouds. John M. Scalo. **277**, 556, 18-B6 (1984)
- The Electron Energy Spectrum Produced in Radio Sources by Turbulent, Resonant Acceleration. Jean A. Eilek and Richard N. Henriksen. **277**, 820, 21-B1 (1984)
- The 21 Centimeter Line Width as an Extragalactic Distance Indicator. III. The Correction for Velocity Dispersion and the B- and H-Band Tully-Fisher Relations. L. Bottinelli, L. Gouguenheim, G. Paturel, and G. de Vaucouleurs. **280**, 34, 49-C14 (1984)
- A Formula for the Shakura-Sunyaev Turbulent Viscosity Parameter. V. M. Canuto, I. Goldman, and O. Hubickyj. **280**, L55, 60-E6 (1984)
- Turbulent Heating in Solar Cosmic-Ray Theory. James Weatherall. **281**, 468, 66-A11 (1984)
- Measurements of Rotation and Turbulence in F, G, and K Dwarfs. David F. Gray. **281**, 719, 70-D3 (1984)
- The Applicability of the Fourier Convolution Theorem to the Analysis of Late-Type Stellar Spectra. David H. Bruning. **281**, 830, 71-E7 (1984)
- Turbulent Compressible Convection in a Deep Atmosphere. II. Two-Dimensional Results for Main-Sequence A5 and F0 Type Envelopes. Sabatino Sofia and Kwong L. Chan. **282**, 550, 81-B4 (1984)
- Diffusion-induced Hydrogen Burning and the Evolution of DA White Dwarfs. G. Michaud and G. Fontaine. **283**, 787, 95-E2 (1984)
- Density Fluctuations in the Interstellar Medium: Evidence for Anisotropic Magnetogasdynamical Turbulence. I. Model and Astrophysical Sites. J. C. Higdon. **285**, 109, 111-B9 (1984)
- Star Cloud Turbulence. R. N. Henriksen and B. E. Turner. **287**, 200, 135-B5 (1984)
- Transport of Dust and Vapor and Chemical Fractionation in the Early Protosolar Cloud. G. E. Morfill and H. J. Völk. **287**, 371, 137-A7 (1984)
- Ultraviolet: General**
- Images in the Rocket Ultraviolet: Photometry of M101. Jesse K. Hill, Ralph C. Bohlin, and Theodore P. Stecher. **277**, 542, 18-A5 (1984)
- On the Origin of the Discrete Character of the Solar Disk Brightness in the 160 Nanometer Continuum. B. Foing and R. M. Bonnet. **279**, 848, 47-B2 (1984)
- Absolute Photometry of the Southern Orion Region in the Vacuum Ultraviolet (1300–2000 Å). Wataru Tanaka, Takashi Onaka, Mineo Sawamura, Tetsuya Watanabe, Keiichi Kodaira, and Keizo Nishi. **280**, 213, 51-D1 (1984)
- Observations of the Stellar Radiation Field at 975 Å. Chet B. Opal and Charles S. Weller. **282**, 445, 80-A10 (1984)
- Frequent Ultraviolet Brightenings Observed in a Solar Active Region with Solar Maximum Mission. Jason G. Porter, Juri Toomre, and Katharine B. Gebbie. **283**, 879, 96-D14 (1984)
- Multifrequency Observations of the BL Lacertae Objects OQ 530 and ON 325. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, M. L. Sitko, W. A. Stein, M. F. Aller, H. D. Aller, P. E. Hodge, R. J. Rudy, H. R. Miller, W. Z. Wisniewski, F. A. Cordova, and K. O. Mason. **284**, 512, 104-F8 (1984)
- Ultraviolet Radiation from White Dwarfs and the Carbon Ionization in the Galactic Halo. Nino Panagia and Yervant Terzian. **287**, 315, 136-D5 (1984)
- Rocket Observations of the Orion Reflection Nebulosity in the Range 130–200 Nanometers and Scattering Properties of Dust Grains in the Far-Ultraviolet. Takashi Onaka, Mineo Sawamura, Wataru Tanaka, Tetsuya Watanabe, and Keiichi Kodaira. **287**, 359, 136-G7 (1984)
- The S201 Far-Ultraviolet Imaging Survey. II. A Field in Cygnus. George R. Carruthers and Thornton Page. **54**, 271, 5-C2 (1984) (Abstr. in **276**, 799, 10-B11)
- The S201 Far-Ultraviolet Imaging Survey. III. A Field in Sagittarius. George R. Carruthers and Thornton Page. **55**, 101, 12-A3 (1984) (Abstr. in **279**, 911, 47-G2)
- Ultraviolet: Spectra**
- LSS 4300: A Hot Counterpart of Upsilon Sagittarii and KS Persei? D. Schönberner and J. S. Drilling. **276**, 229, 3-D1 (1984)
- Comments on the Ultraviolet Spectrum of γ^2 Velorum. Jorge Sahade, Yoji Kondo, and George E. McCluskey, Jr. **276**, 281, 3-G11 (1984)
- Variability of the Ultraviolet Spectrum of BL Lacertae Objects. M. H. Ulrich, K. R. H. Hackney, R. L. Hackney, and Y. Kondo. **276**, 466, 6-F2 (1984)
- The High-Ionization and Excited-State Interstellar Lines in the Carina Nebula: A Giant H II Region in Absorption. Nolan R. Walborn, Joy N. Heckathorn, and James E. Hesser. **276**, 524, 7-C9 (1984)
- Ultraviolet Extinction and Diffuse Band Strength Correlations.

Ultraviolet Spectra—Continued

- C. Gregory Seab and Theodore P. Snow, Jr. **277**, 200, 13-B6 (1984)
- The Ultraviolet Spectrum of a Strongly Reddened, High-Excitation Herbig-Haro Object. K. H. Böhm and E. Böhm-Vitense. **277**, 216, 13-C8 (1984)
- Rotational Modulation of the Chromospheric Activity in χ^1 Orionis (G0 V). Ann Merchant Boesgaard and Theodore Simon. **277**, 241, 13-E5 (1984)
- Interstellar O₂. II. VUV Oscillator Strengths of Schumann-Runge Lines and Prospects for Space Telescope Observations. Peter L. Smith, H. E. Griesinger, John H. Black, K. Yoshino, and D. E. Freeman. **277**, 569, 18-C5 (1984)
- GD 323: A White Dwarf with a Stratified H/He Atmosphere? James Liebert, F. Wesemael, E. M. Sion, and G. Wegner. **277**, 692, 19-F3 (1984)
- Ultraviolet Spectroscopy of the Dwarf Nova U Geminorum. R. J. Panek and A. V. Holm. **277**, 700, 19-F11 (1984)
- Laboratory Identification of the $3s^2 3p^2 \ ^3P_{2,1} - 3s 3p^3 \ ^5S_0$ Intersystem Lines of S III. Peter L. Smith, Carl Erik Magnusson, and Per Olof Zetterberg. **277**, L79, 23-A5 (1984)
- IUE and Ground-based Observations of the Hubble-Sandage Variables in M31 and M33. R. M. Humphreys, C. Blaha, S. D'Odorico, T. R. Gull, and P. Benvenuti. **278**, 124, 25-D2 (1984)
- Spectrophotometry of Extreme Helium Stars: Ultraviolet Fluxes and Effective Temperatures. J. S. Drilling, D. Schönberner, U. Heber, and A. E. Lynas-Gray. **278**, 224, 26-D8 (1984)
- Absolute Spectrophotometry of Wolf-Rayet Stars from 1200 to 7000 Å: A Cautionary Tale. Catharine D. Garmany, Philip Massey, and Peter S. Conti. **278**, 233, 26-E3 (1984)
- Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman. **278**, 255, 26-F11 (1984)
- IUE Observations of Centaurus X-4 during the 1979 May Outburst. William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank. **278**, 270, 27-A1 (1984)
- HRTS II EUV Observations of a Solar Ephemeral Region. Robert Roussel-Dupré, Jay Wrathall, K. R. Nicolas, J.-D. F. Bartoe, and G. E. Brueckner. **278**, 428, 28-E9 (1984)
- IUE Observations of Longitudinal and Temporal Variations in the Jovian Auroral Emission. T. E. Skinner, S. T. Durrance, P. D. Feldman, and H. W. Moos. **278**, 441, 28-F11 (1984)
- Two Multifrequency Observations of 3C 371. D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock. **278**, 521, 31-E14 (1984)
- High-Resolution IUE Observations of Interstellar Absorption Lines in the Vela Supernova Remnant. Edward B. Jenkins, George Wallerstein, and Joseph Silk. **278**, 649, 33-A12 (1984)
- Effective Temperatures and Luminosities of Very Hot O Type Subdwarfs. D. Schönberner and J. S. Drilling. **278**, 702, 33-E9 (1984)
- The Problem of the Barium Stars. Erika Böhm-Vitense, James Nemeč, and Charles Proffitt. **278**, 726, 33-G6 (1984)
- Correlated Observations of Impulsive UV and Hard X-Ray Bursts in Solar Flares from the Solar Maximum Mission. Chung-Chieh Cheng, Einar Tandberg-Hanssen, and L. E. Orwig. **278**, 853, 35-B11 (1984)
- Sigma Geminorum (K1 III + ?): Variability of the Ultraviolet Lines near Conjunction. Thomas R. Ayres, Theodore Simon, and Jeffrey L. Linsky. **279**, 197, 39-B8 (1984)
- The Chromospheres of Classical Cepheids. II. High-Resolution Profiles of the Mg II h and k Lines. Edward G. Schmidt and Sidney B. Parsons. **279**, 202, 39-C1 (1984)
- The Chromospheres of Classical Cepheids. III. A Search for Transition Region Emission Lines. Edward G. Schmidt and Sidney B. Parsons. **279**, 215, 39-D2 (1984)
- Ultraviolet Observations of Interstellar Extinction near the Cepheus OB3 Molecular Cloud. Derck Massa and Blair D. Savage. **279**, 310, 40-D5 (1984)
- The Effects of a Multidensity Plasma on Ultraviolet Spectroscopic Electron Density Diagnostics. G. A. Daschek. **279**, 446, 41-G7 (1984)
- International Ultraviolet Explorer Observations of Stars in 30 Doradus: Extinction and Stellar Continua. Edward L. Fitzpatrick and Blair D. Savage. **279**, 578, 44-B10 (1984)
- The Variation of Galactic Interstellar Extinction in the Ultraviolet. A. N. Witt, R. C. Bohlin, and T. P. Stecher. **279**, 698, 45-D11 (1984)
- Ultraviolet Observations of the Peculiar Supernova Remnant in NGC 4449. William P. Blair, John C. Raymond, Robert A. Fesen, and Theodore R. Gull. **279**, 708, 45-E7 (1984)
- Ultraviolet and Optical Spectroscopy of Cn 1-1 (= HDE 330036). Julie H. Lutz. **279**, 714, 45-E13 (1984)
- On the Dispersion in Brightness of Far-Ultraviolet Emission Lines of Cool Giant Stars. Theodore Simon. **279**, 738, 45-G11 (1984)
- Two New Extremely Hot Pulsating White Dwarfs. Howard E. Bond, Albert D. Grauer, Richard F. Green, and James W. Liebert. **279**, 751, 46-A10 (1984)
- IUE Spectrophotometry of the DA4 Primary in the Short-Period White Dwarf-Red Dwarf Spectroscopic Binary Case 1. E. M. Sion, F. Wesemael, and E. F. Guinan. **279**, 758, 46-B3 (1984)
- A Study of the Dependence of Mg II Emission on the Rotational Periods of Main-Sequence Stars. L. Hartmann, S. L. Baliunas, D. K. Duncan, and R. W. Noyes. **279**, 778, 46-C10 (1984)
- X-Ray and UV Observations of Two Radio-bright Quasars. Martin Elvis and G. Fabbiano. **280**, 91, 50-A8 (1984)
- The Dust around R Coronae Borealis Type Stars. J. H. Hecht, A. V. Holm, B. Donn, and Chi-Chao Wu. **280**, 228, 51-E3 (1984)
- The Energy Relation between Hard X-Ray and O V Emission in Solar Flares. A. I. Poland, L. E. Orwig, J. T. Mariska, R. Nakatsuka, and L. H. Auer. **280**, 47, 53-G11 (1984)
- C IV $\lambda 1550$ Emission Profiles in IUE Spectra of Seyfert 1 Galaxies. Ronald Stoner and Roger Ptak. **280**, 516, 55-D14 (1984)
- Abundance of Interstellar Aluminum. E. S. Barker, P. M. Lugger, E. J. Weiler, and D. G. York. **280**, 600, 56-D5 (1984)
- Ultraviolet Spectroscopy of the Planetary Nebula in the Fornax Galaxy. Stephen P. Maran, Theodore R. Gull, Theodore P. Stecher, Lawrence H. Aller, and Charles D. Keyes. **280**, 615, 56-E7 (1984)
- The Far-Ultraviolet Energy Distribution of Sirius B from Voyager 2. J. B. Holberg, F. Wesemael, and I. Hebešny. **280**, 679, 57-C5 (1984)
- Do Bipolar Magnetic Regions Exist on the Surfaces of Early-Type Stars? Anne B. Underhill and Richard P. Fahey. **280**, 712, 57-E11 (1984)
- An Unprecedented UV/Optical Flare in TV Columbae. Paula Szkody and Mario Mateo. **280**, 729, 57-F13 (1984)
- Ultraviolet Spectral Morphology of the O Stars: The Remarkable Luminosity Dependence of the Si IV Stellar Wind Effect. Nolan R. Walborn and Robert J. Panek. **280**, L27, 54-E3 (1984)
- IUE Observations of High-Redshift Quasars. Jill Bechtold, Richard F. Green, Ray J. Weymann, Maarten Schmidt, Frank B. Estabrook, Richard D. Sherman, Hugo D. Wahlquist, and T. M. Heckman. **281**, 76, 61-F12 (1984)
- Ultraviolet Observations of Starburst and Mini-Seyfert Galactic Nuclei. Trinh X. Thuan. **281**, 126, 62-C9 (1984)
- IUE Observations of DQ Herculis and Its Nebula, and the Nature of the Cold Nova Shells. G. J. Ferland, R. E. Williams, D. L. Lambert, G. A. Shields, M. Slovák, P. M. Gondhalekar, and J. W. Truran. **281**, 194, 63-A12 (1984)
- A Skylab Flare Associated with a Hard X-Ray Burst. Kenneth Widing and Eijiro Hiei. **281**, 426, 65-E4 (1984)
- Effects of Mass Motions on Solar Emission Measures Inferred from Transition-Region Emission Lines. John T. Mariska. **281**, 435, 65-E14 (1984)
- The 1982 Eclipse of 31 Cygni. Robert E. Stencel, Jeffrey L. Hopkins, Wendy Hagen, Robert Fried, Paul C. Schmidtke, Yoji Kondo, and Robert D. Chapman. **281**, 751, 70-F7 (1984)
- X Cygni: Duplicity, Period Stability, and Atmospheric Velocity Structure. Nancy Remeig Evans. **281**, 760, 70-G2 (1984)
- Far-Ultraviolet Observations of BW Vulpeculae with Voyager 2. Don C. Barry, J. B. Holberg, W. T. Forrester, R. S. Polidan, and Ingemar Furenlid. **281**, 766, 70-G8 (1984)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana. **281**, 815, 71-D5 (1984)
- High-Resolution Telescope and Spectrograph Observations of the Quiet Solar Chromosphere and Transition Zone. K. P. Dere, J.-D. F. Bartoe, and G. E. Brueckner. **281**, 870, 72-A6 (1984)
- Changes in the Ultraviolet Spectrum of EG Andromedae. Robert E. Stencel. **281**, L75, 73-B10 (1984)
- Ultraviolet Interstellar Absorption toward Stars in the Small Magellanic Cloud. II. Sk 159. Edward L. Fitzpatrick. **282**, 436, 80-A1 (1984)
- Interstellar Magnesium Abundances. M. J. Murray, P. L. Dufton, A. Hibbert, and D. G. York. **282**, 481, 80-D5 (1984)
- The Central Star of the Planetary Nebula Abell 78. James B. Kaler and Walter A. Feibelman. **282**, 719, 83-A1 (1984)
- Ultraviolet and Visible Flare Observations of EQ Pegasi B. Sallie L. Baliunas and John C. Raymond. **282**, L28, 83-A10 (1984)
- Ultraviolet Flare on Lambda Andromedae. S. L. Baliunas, E. F. Guinan, and A. K. Dupree. **282**, 733, 83-B1 (1984)
- Temporal and Spatial Behavior of the Ultraviolet Emissions of Comet Iras-Araki-Alcock 1983d. P. D. Feldman, M. F. A'Hearn, and R. L. Millis. **282**, 799, 83-F14 (1984)
- Oscillator Strengths and Collision Strengths for S III. Y. K. Ho and Ronald J. W. Henry. **282**, 816, 84-A6 (1984)
- Line Profile Variation in δ Orionis A, ϵ Orionis A, and 15 Monocerotis. C. A. Grady, T. P. Snow, and W. C. Cash. **283**, 218, 88-D4 (1984)

- IUE* Observations of High-Velocity Symbiotic Star AG Draconis. II. The Spectral Variations during 1979–1983. R. Viotti, A. Altamore, G. B. Baratta, A. Cassatella, and M. Friedjung. **283**, 226, 88-D13 (1984)
- Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. G. Hammerschlag-Hensberge, T. R. Kallman, and J. D. Howarth. **283**, 249, 88-F8 (1984)
- Carotating Interaction Regions in Stellar Winds. D. J. Mullan. **283**, 303, 89-C11 (1984)
- High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance. A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres. **283**, 731, 95-A1 (1984)
- Evidence for a High-Temperature Accretion Region in Algol-Type Binary Systems. Geraldine J. Peters and Ronald S. Polidan. **283**, 745, 95-B1 (1984)
- Line Identifications in the Ultraviolet (2590–3230 Å) Spectrum of the Hydrogen-deficient Carbon Star HD 182040. Hollis R. Johnson, Mudhaffer M. Ameen, and Joel A. Eaton. **283**, 760, 95-C2 (1984)
- Cygnus X-2: Neutron Star or Degenerate Dwarf? J. E. McClintock, L. D. Petro, G. Hammerschlag-Hensberge, C. R. Proffitt, and R. A. Remillard. **283**, 794, 95-E9 (1984)
- Frequent Ultraviolet Brightenings Observed in a Solar Active Region with Solar Maximum Mission. Jason G. Porter, Juri Toomre, and Katharine B. Gebbie. **283**, 879, 96-D14 (1984)
- Far-Ultraviolet Spectrophotometry of Two Very Hot O Type Subdwarfs. J. S. Drilling, J. B. Holberg, and D. Schönberner. **283**, L67, 97-D3 (1984)
- Collision Strengths for $\lambda 1199$ and $\lambda 1729$ of S III. Y. K. Ho and Ronald J. W. Henry. **284**, 435, 102-F2 (1984)
- Mass Loss in O-Type Stars: Parameters Which Affect It. C. D. Garmany and P. S. Conti. **284**, 705, 106-F8 (1984)
- Asymmetries in Stellar Mg II h and k and Ca II H and K Line Profiles: Discrepancies Between Mg and Ca Asymmetries. D. J. Mullan. **284**, 769, 107-D5 (1984)
- The Origin of Low-Velocity Absorption Components in the Mg II Resonance Lines of Hybrid-Chromosphere Stars. S. A. Drake, A. Brown, and J. L. Linsky. **284**, 774, 107-D10 (1984)
- The Many Faces of Capella: A Search for Rotational Modulations and a Study of Systematic Velocities of Emission Lines in the Ultraviolet. Thomas R. Ayres. **284**, 784, 107-E7 (1984)
- The Discontinuity near 1600 Å in the Spectra of DA White Dwarfs. Gary Wegner. **284**, L43, 109-B13 (1984)
- The Variable Component of the NGC 4151 *IUE* Spectrum: Evidence for an Expanding Spherical Emission Shell. Ronald Stoner, Roger Ptak, and Stephen Gregory. **285**, 69, 110-F9 (1984)
- Optical Properties of Interstellar Graphite and Silicate Grains. B. T. Draine and Hyung Mok Lee. **285**, 89, 111-A3 (1984)
- Characteristics of the Fe II and C II Emission in High-Resolution *IUE* Spectra (2300–3000 Å) of Alpha Orionis. Kenneth G. Carpenter. **285**, 181, 112-A1 (1984)
- Coordinated UV and Optical Observations of the AM Herculis Object E1405 – 451 in the High and Low States. L. Maraschi, A. Treves, E. G. Tanzi, M. Mouchet, A. Lauberts, C. Motch, J. M. Bonnet Bidaud, and M. M. Phillips. **285**, 214, 112-C6 (1984)
- Plasma Diagnostics for the Outer Solar Corona: UV and XUV Fe XII Lines. George L. Withbroe and John C. Raymond. **285**, 347, 113-F7 (1984)
- IUE* Observations of the Clusters of the Magellanic Clouds. J. G. Cohen, R. M. Rich, and S. E. Persson. **285**, 595, 118-A12 (1984)
- The Reflection Nebula NGC 1999. Jason A. Cardelli and K. H. Böhm. **285**, 613, 118-C2 (1984)
- Circumstellar Material around Rapidly Rotating B Stars. II. On the Nature of Ultraviolet Shell Lines in the Spectra of Be and Shell Stars. William R. Oegerle and Ronald S. Polidan. **285**, 648, 118-E9 (1984)
- The Ultraviolet Variability of Early-Type Supergiants. Anne B. Underhill. **285**, 668, 118-G1 (1984)
- Observations of Interstellar Hydrogen and Deuterium toward Alpha Centauri A. W. B. Landsman, R. C. Henry, H. W. Moos, and J. L. Linsky. **285**, 801, 120-C1 (1984)
- Ultraviolet Spectral Morphology of the O Stars. II. The Main Sequence. Nolan R. Walborn and Robert J. Panek. **286**, 718, 131-A4 (1984)
- The Resonance Lines of Hg II in *IUE* Spectra of Chemically Peculiar Stars. David S. Leckrone. **286**, 725, 131-A14 (1984)
- An Analysis by Wavelength Coincidence Statistics of the Ultraviolet Spectrum of Kappa Cancri. George T. Chionacki, Charles R. Cowley, and Donald J. Bord. **286**, 736, 131-B11 (1984)
- Rotational Velocities of Later B Type and A Type Stars as Determined from Ultraviolet versus Visual Line Profiles. Kenneth G. Carpenter, Arne Slettebak, and George Sonneborn. **286**, 741, 131-C2 (1984)
- Hot Subdwarfs in Detached Binary Systems and Thick-Disk Cataclysmic Variables from the Palomar-Green Survey. Donald H. Ferguson, Richard F. Green, and James Liebert. **287**, 320, 136-D10 (1984)
- The Unique Planetary Nebula NGC 2818. Reginald J. Dufour. **287**, 341, 136-F3 (1984)
- IUE* Observations of the “Butterfly” Nebula M2-9. Walter A. Feibelman. **287**, 353, 136-G1 (1984)
- Main-Sequence B Stars with Strong Winds in the Core of NGC 6231. Derck Massa, Blair D. Savage, and Joseph P. Cassinelli. **287**, 814, 143-B9 (1984)
- The Ultraviolet Spectra of the O and B Stars in the Young Galactic Cluster NGC 6530. Erika Böhm-Vitense, Paul Hodge, and Don Boggs. **287**, 825, 143-C7 (1984)
- Metal Abundances in the Hot DA White Dwarfs Wolf 1346 and Feige 24. F. Wesemael, R. B. C. Henry, and H. L. Shipman. **287**, 868, 143-F11 (1984)
- The Temperature of C II Emission-Line Formation Regions in Cool Stars. Alexander Brown and Kenneth G. Carpenter. **287**, L43, 138-F1 (1984)
- The Early-Type Strong Emission-Line Supergiants of the Magellanic Clouds: A Spectroscopic Zoology. Steven N. Shore and N. Sanduleak. **55**, 1, 11-A2 (1984) (Abstr. in **279**, 909, 47-F14)
- Comparison of Variations in the Visible and Ultraviolet Spectra of a Centauri. Richard P. Fahey. **55**, 507, 17-F3 (1984) (Abstr. in **281**, 892, 72-C5)

W Virginis Stars: see Stars: Cepheids

X-Rays: Binaries

- Optical Identification of 2S 1417 – 62. J. E. Grindlay, L. D. Petro, and J. E. McClintock. **276**, 621, 8-C11 (1984)
- A Search for Periods Longer than 5.6 Days in the Optical Spectrum of HDE 226868 = Cygnus X-1. D. R. Gies and C. T. Bolton. **276**, L17, 5-F7 (1984)
- Contact Binary Stars. I. An X-Ray Survey. R. G. Cruddace and A. K. Dupree. **277**, 263, 13-G1 (1984)
- MXB 1916 – 053/4U 1915 – 05: Burst Properties and Constraints on a 50 Minute Binary Secondary. J. H. Swank, R. E. Taam, and N. E. White. **277**, 274, 14-A1 (1984)
- The Central X-Ray Source in SS 433. J. E. Grindlay, D. Band, F. Seward, D. Leahy, M. C. Weisskopf, and F. E. Marshall. **277**, 286, 14-A13 (1984)
- E2003 + 225: A $3^{h}42^{m}$ AM Herculis Type Binary System. J. A. Nousek, L. O. Takalo, G. D. Schmidt, S. Tapia, G. J. Hill, H. E. Bond, R. A. Stern, and P. C. Agrawal. **277**, 682, 19-E7 (1984)
- The High-Energy X-Ray Spectrum of Centaurus XR-3 Observed from OSO 8. J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig. **278**, 266, 26-G8 (1984)
- IUE* Observations of Centaurus X-4 during the 1979 May Outburst. William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank. **278**, 270, 27-A1 (1984)
- Boundary Layers in Cataclysmic Variables: The HEAO 1 X-Ray Constraints. Kenneth A. Jensen. **278**, 278, 27-A10 (1984)
- Millisecond Variability of Cygnus X-1. J. F. Meekins, K. S. Wood, R. L. Hedder, E. T. Byram, D. J. Yentis, T. A. Chubb, and H. Friedman. **278**, 288, 27-B6 (1984)
- Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Magnetosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. R. F. Elsner and F. K. Lamb. **278**, 326, 27-E4 (1984)
- X-Ray Observations of X Persei. M. C. Weisskopf, R. F. Elsner, W. Darbro, S. Naranan, V. J. Weisskopf, A. Williams, N. E. White, J. E. Grindlay, and P. G. Sutherland. **278**, 711, 33-F5 (1984)
- Observations of Quasi-coherent Soft X-Ray Oscillations in U Geminorum and SS Cygni. F. A. Cordova, T. J. Chester, K. O. Mason, S. M. Kahn, and G. P. Garmire. **278**, 739, 34-A9 (1984)
- SAS 3 Observations of Cygnus X-1: The Intensity Dips. Ronald A. Remillard and Claude R. Canizares. **278**, 761, 34-C3 (1984)
- Supernovae in Cataclysmic Variable Systems and the Formation of Low-Mass X-Ray Binaries. Ronald E. Taam and B. A. Fryxell. **279**, 166, 38-G2 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes. **279**, 177, 39-A1 (1984)
- Polarization of Comptonized Photons. A. C. Williams. **279**, 401, 41-C12 (1984)
- VV Puppis: The Soft X-Ray Machine. Joseph Patterson, K. Beuermann, D. Q. Lamb, G. Fabbiano, J. C. Raymond, J. Swank, and N. E. White. **279**, 785, 46-D3 (1984)
- A Search for X-Ray Polarization in Cosmic X-Ray Sources. John P. Hughes, Knox S. Long, and Robert Novick. **280**, 255, 51-G2 (1984)
- Secular Variation and Short-Term Fluctuations of the Pulse Period of Vela X-1. F. Nagase, S. Hayakawa, H. Kunieda, K. Masai, N. Sato,

X-Rays: Binaries—Continued

- Y. Tawara, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **280**, 259, 51-G6 (1984)
- Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock. **280**, 688, 57-C14 (1984)
- Models of the Hard X-Ray Spectrum of AM Herculis and Implications for the Accretion Rate. J. H. Swank, A. C. Fabian, and R. R. Ross. **280**, 734, 57-G3 (1984)
- The Unusually Soft X-Ray Spectrum of LMC X-3. N. E. White and F. E. Marshall. **281**, 354, 64-G1 (1984)
- Evidence for Weak X-Ray Burst Emission from Cygnus X-2 and GX 17 + 2. Steven M. Kahn and Jonathan E. Grindlay. **281**, 826, 71-E3 (1984)
- Spectral Variability in Early-Type Binary X-Ray Systems. Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson. **282**, 245, 76-E7 (1984)
- The Appearance, Number, and History of Highly Compact Binary Systems in Globular Clusters. Julian H. Krolik. **282**, 452, 80-B4 (1984)
- The Evolution of Highly Compact Binary Stellar Systems in Globular Clusters. J. H. Krolik, A. Meiksin, and P. C. Joss. **282**, 466, 80-C4 (1984)
- Conservative Mass Transfer. II. The Effective Perturbing Force: Equations of Motion for the Eccentricity and Orbital Period. John J. Matese and Daniel P. Whitmire. **282**, 522, 80-G4 (1984)
- Einstein Observations of Selected Close Binaries and Shell Stars. Edward F. Guinan, Robert H. Koch, and Mirek J. Plavec. **282**, 667, 82-C11 (1984)
- A Study of the Spectra and Pulse Profiles of Centaurus X-3 from Hakucho. R. Lieu, D. Venkatesan, and K. Mitani. **282**, 709, 82-F14 (1984)
- Ultraviolet High-Resolution Spectroscopy of the X-Ray Binary Sk 160/SMC X-1. G. Hammerschlag-Hensberge, T. R. Kallman, and I. D. Howarth. **283**, 249, 88-F8 (1984)
- High-Resolution Soft X-Ray Spectra of Scorpius X-1: The Structure of Circumsource Accreting Material. Steven M. Kahn, Frederick D. Seward, and Tomasz Chlebowski. **283**, 286, 89-B7 (1984)
- SMC X-1 Variability Observed from HEAO 1. D. E. Gruber and R. E. Rothschild. **283**, 546, 92-G1 (1984)
- X-Ray Emission from Symbiotic Novae. Sun Kwok and D. A. Leahy. **283**, 675, 94-C11 (1984)
- Discovery of a 7.1 Hour Period and Eclipses from MXB 1659 - 29. L. R. Cominsky and K. S. Wood. **283**, 765, 95-C8 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- Cygnus X-2: Neutron Star or Degenerate Dwarf? J. E. McClintock, L. D. Petro, G. Hammerschlag-Hensberge, C. R. Proffitt, and R. A. Remillard. **283**, 794, 95-E9 (1984)
- Evidence for 4.4 Hour Periodic Dips in the X-Ray Flux from 4U 1755-33. N. E. White, A. N. Parmar, M. Sztajno, H. U. Zimmermann, K. O. Mason, and S. M. Kahn. **283**, L9, 91-E11 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yenits. **283**, L53, 97-C2 (1984)
- Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambuster, W. A. Snyder, and K. S. Wood. **284**, 270, 101-A5 (1984)
- Effects of Encounters with Field Stars on the Evolution of Low-Mass Semidetached Binaries. Piet Hut and Bohdan Paczyński. **284**, 675, 106-D6 (1984)
- Discovery of a 176 Day Period in 4U 1820 - 30. W. Friedhorsky and J. Terrell. **284**, L17, 103-B4 (1984)
- Comparison of the X-Ray Observations of the AM Herculis Objects to Theory. James N. Imamura. **285**, 223, 112-D2 (1984)
- On the Origin of X-Ray Variability of SS 433. David L. Band and Jonathan E. Grindlay. **285**, 702, 119-B11 (1984)
- Short-Term X-Ray Variability of GX 339-4. Y. Maejima, K. Makishima, M. Matsuoka, Y. Ogawara, M. Oda, Y. Tawara, and K. Doi. **285**, 712, 119-C7 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles. **286**, 196, 124-B2 (1984)
- Self-Absorption of High-Energy Gamma-Rays in Cygnus X-3. Krishna M. V. Apparao. **287**, 338, 136-E14 (1984)
- X-Rays from Accretion of Red Giant Winds. M. Jura and D. J. Helfand. **287**, 785, 142-G8 (1984)
- The 41.5 Day Binary X-Ray Pulsar 4U 1223 - 62 (GX 301 - 2). N. E. White and J. H. Swank. **287**, 856, 143-E13 (1984)
- X-Rays: Bursts
- A Very Long X-Ray Burst with a Precursor from XB 1715 - 321. Y. Tawara, T. Kii, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, H. Inoue, K. Koyama, F. Makino, K. Makishima, M. Matsuoka, T. Murakami, M. Oda, Y. Ogawara, T. Ohashi, N. Shibazaki, Y. Tanaka, S. Miyamoto, H. Tsunemi, K. Yamashita, and I. Kondo. **287**, L41, 10-E12 (1984)
- MXB 1916 - 053/4U 1915 - 05: Burst Properties and Constraints on a 50 Minute Binary Secondary. J. H. Swank, R. E. Taam, and N. E. White. **277**, 274, 14-A1 (1984)
- Precursors to X-Ray Bursts: The Result of Expansion and Subsequent Contraction of the Neutron Star's Photosphere. Walter H. G. Lewin, William D. Vacca, and Ewa M. Basinska. **277**, L57, 22-F8 (1984)
- IUE Observations of Centaurus X-4 during the 1979 May Outburst. William P. Blair, John C. Raymond, A. K. Dupree, Chi-Chao Wu, Albert V. Holm, and Jean H. Swank. **278**, 270, 27-A1 (1984)
- Accretion by Magnetic Neutron Stars. II. Plasma Entry into the Magnetosphere via Diffusion, Polar Cusps, and Magnetic Field Reconnection. R. F. Elsner and F. K. Lamb. **278**, 326, 27-E4 (1984)
- X-Ray Observations of the Burst Source MXB 1728 - 34. E. M. Basinska, W. H. G. Lewin, M. Sztajno, L. R. Cominsky, and F. J. Marshall. **281**, 337, 64-E9 (1984)
- Evidence for Weak X-Ray Burst Emission from Cygnus X-2 and GX 17 + 2. Steven M. Kahn and Jonathan E. Grindlay. **281**, 826, 71-E3 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. Paul Hertz and Jonathan E. Grindlay. **282**, 118, 75-C2 (1984)
- Short-Term X-Ray Variability of the Globular Cluster Source 4U 1820 - 30 (NGC 6624). L. Stella, S. M. Kahn, and J. E. Grindlay. **282**, 713, 82-G4 (1984)
- Solar Flare Iron K α Emission Associated with a Hard X-Ray Burst. Katsuo Tanaka, Tetsuya Watanabe, and Nariaki Nitta. **282**, 793, 83-F8 (1984)
- Determination of the Mass of Globular Cluster X-Ray Sources. J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman. **282**, L13, 78-A13 (1984)
- Discovery of a 7.1 Hour Period and Eclipses from MXB 1659 - 29. L. R. Cominsky and K. S. Wood. **283**, 765, 95-C8 (1984)
- Delays of Optical Bursts in Simultaneous Optical and X-Ray Observations of MXB 1636 - 53. M. Matsuoka, K. Mitsuda, T. Ohashi, H. Inoue, K. Koyama, F. Makino, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, N. Shibazaki, Y. Tanaka, K. Tsuno, S. Miyamoto, H. Tsunemi, K. Yamashita, S. Hayakawa, H. Kunieda, K. Masai, F. Nagase, Y. Tawara, I. Kondo, L. Cominsky, J. G. Jernigan, A. Lawrence, W. H. G. Lewin, H. Pedersen, C. Motch, and J. Van Paradijs. **283**, 774, 95-D3 (1984)
- HEAO 1 High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primini, and W. H. G. Lewin. **285**, 258, 112-F9 (1984)
- A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognos 7) Satellite Experiment. P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky. **285**, L67, 121-E10 (1984)
- Lateral Propagation of the Helium Shell Flash on an Accreting Neutron Star. Toshiya Nozakura, Satoru Ikeuchi, and Masayuki Y. Fujimoto. **286**, 221, 124-C13 (1984)
- The Evolution of the Inner Regions of Viscous Accretion Disks Surrounding Neutron Stars. Ronald E. Taam and N. C. Lin. **287**, 761, 142-E12 (1984)
- The Spectra of X-Ray Bursting Neutron Stars. Richard A. London, Ronald E. Taam, and W. Michael Howard. **287**, L27, 138-D14 (1984)
- The Vertical Structure and Stability of Alpha Model Accretion Disks. J. K. Cannizzo and J. C. Wheeler. **55**, 367, 16-A2 (1984) (Abstr. in **281**, 890, 72-C3)
- X-Rays: General
- A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- On Interstellar [Fe x] Absorption toward Cepheus OB2. L. M. Hobbs. **284**, L47, 109-C3 (1984)
- The Nonstellar Continuum of the Seyfert Galaxy NGC 7213. J. P. Halpern and Alexei V. Filippenko. **285**, 475, 116-E13 (1984)
- Limits on Diffuse X-Ray Emission from M101. D. McCammon and W.

- T. Sanders*. **287**, 167, 134-F13 (1984)
- Limits on Soft X-Ray Flux from Distant Emission Regions. *D. N. Burrows, D. McCammon, W. T. Sanders, and W. L. Kraushaar*. **287**, 208, 135-B13 (1984)
- The Detection of X-Rays from Nova Muscae 1983 with the EXOSAT Satellite. *H. Ogelman, K. Beuermann, and J. Krautter*. **287**, L31, 138-E4 (1984)
- X-Rays: Sources**
- The Structure of Clusters of Galaxies Observed with Einstein. *C. Jones and W. Forman*. **276**, 38, 1-D1 (1984)
- X-Ray Observations of Broad Absorption-Line Quasars. *Joel N. Bregman*. **276**, 423, 6-B12 (1984)
- Optical Characteristics of Young Quasars as Sources of the Cosmic X-Ray Background. *Elihu Boldt and Darryl Leiter*. **276**, 427, 6-C2 (1984)
- The Broad-Band X-Ray Spectrum of a QSO Sample. *D. M. Worrall and F. E. Marshall*. **276**, 434, 6-C10 (1984)
- Multifrequency Observations of the BL Lacertae Object 0735 + 178. *J. N. Bregman, A. E. Glassgold, P. J. Huggins, H. D. Aller, M. F. Aller, P. E. Hodge, G. H. Rieke, M. J. Lebofsky, J. T. Pollock, A. J. Pica, R. J. Leacock, A. G. Smith, J. Webb, T. J. Balonek, W. A. Dent, C. P. O'Dea, W. H.-M. Ku, D. A. Schwartz, J. S. Miller, R. J. Rudy, and P. D. LeVan*. **276**, 454, 6-E2 (1984)
- Photon Escape Probabilities in a Semi-infinite Plane-parallel Medium. *A. C. Williams, R. F. Elsner, M. C. Weisskopf, and W. Darbro*. **276**, 691, 9-B1 (1984)
- A Search for Periods Longer than 5.6 Days in the Optical Spectrum of HDE 226868 = Cygnus X-1. *D. R. Gies and C. T. Bolton*. **276**, L17, 5-F7 (1984)
- An Identification for "Geminga" (2CG 195 + 04): The Optical Counterpart of 1E 0630 + 178, A Unique Object in the Gamma-Ray Source Error Box. *Patrizia A. Caraveo, Giovanni F. Bignami, Laurent Vigroux, and Jacques A. Paul*. **276**, L45, 10-F2 (1984)
- Clusters of Galaxies as a Probe of the Intergalactic Medium. *W. Forman, C. Jones, and W. Tucker*. **277**, 19, 11-B10 (1984)
- 1E 0104.2 + 3153: A Broad Absorption-Line QSO Viewed through a Giant Elliptical Galaxy. *J. T. Stocke, James Liebert, R. Schild, I. M. Gioia, and T. Maccacaro*. **277**, 43, 11-D6 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies. *G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis*. **277**, 115, 12-B12 (1984)
- Observational Tests of X-Ray Heating in the Broad-Line Region of Quasars and Seyfert Galaxies. *Gerard A. Kriss*. **277**, 495, 17-D13 (1984)
- XUV Observations of Capella and the Local Interstellar Medium. *Norman Bobroff, John Nousek, and Gordon Garmire*. **277**, 678, 19-E3 (1984)
- An X-Ray Study of the Remnant of SN 185 A.D. *Ryszard L. Pisarski, David J. Helfand, and Steven M. Kahn*. **277**, 710, 19-G7 (1984)
- Surface Photometry in Cores of Globular Clusters. *S. Djorgovski and Jean R. King*. **277**, L49, 22-E14 (1984)
- Precursors to X-Ray Bursts: The Result of Expansion and Subsequent Contraction of the Neutron Star's Photosphere. *Walter H. G. Lewin, William D. Vacca, and Ewa M. Basinska*. **277**, L57, 22-F8 (1984)
- X-Ray Variability of Quasars. *G. Zamorani, P. Giommi, T. Maccacaro, and H. Tananbaum*. **278**, 28, 24-C11 (1984)
- What Bends 3C 465? *J. A. Eilek, J. O. Burns, C. P. O'Dea, and F. N. Owen*. **278**, 37, 24-D6 (1984)
- The Einstein Galactic Plane Survey: Statistical Analysis of the Complete X-Ray Sample. *Paul Hertz and Jonathan E. Grindlay*. **278**, 137, 25-E3 (1984)
- Photospheric Soft X-Ray Emission from Hot DA White Dwarfs. *Steven M. Kahn, F. Wesemael, James Liebert, John C. Raymond, J. E. Steiner, and Harry L. Shipman*. **278**, 255, 26-F11 (1984)
- Gravitational Radiation from Accreting Neutron Stars. *Robert V. Wagoner*. **278**, 345, 27-F9 (1984)
- Einstein Observations of X-Ray Emission from A Stars: Erratum. *L. Golub, H. D. Harnden, C. W. Maxson, R. Rosner, G. S. Vaiana, Webster Cash, Jr., and Theodore P. Snow, Jr.* **278**, 456, 28-G12 (1984) (Orig. paper in **271**, 264, 90-G11)
- Two Multifrequency Observations of 3C 371. *D. M. Worrall, J. J. Puschell, F. C. Bruhweiler, H. R. Miller, R. J. Rudy, W. H.-M. Ku, M. F. Aller, H. D. Aller, P. E. Hodge, K. Matthews, G. Neugebauer, B. T. Soifer, J. R. Webb, A. J. Pica, J. T. Pollock, A. G. Smith, and R. J. Leacock*. **278**, 521, 31-E14 (1984)
- The Mass Profile and Gas Content of M87. *G. C. Stewart, C. R. Canizares, A. C. Fabian, and P. E. J. Nulsen*. **278**, 536, 31-G1 (1984)
- Einstein Observations of the Cygnus Loop. *William H.-M. Ku, Steven M. Kahn, Ryszard Pisarski, and Knox S. Long*. **278**, 615, 32-E13 (1984)
- Evolution of Pulsar-driven Supernova Remnants. *S. P. Reynolds and R. A. Chevalier*. **278**, 630, 32-G7 (1984)
- A Sharp X-Ray Absorption Feature in the BL Lacertae Object PKS 2155 - 304. *Claude R. Canizares and John Kruper*. **278**, L99, 36-B2 (1984)
- Optical Observations of the BL Lacertae Object 2155 - 304 and Implications regarding the X-Ray Absorption Feature at 500-700 eV. *Stuart Bowyer, Jean Brodie, John T. Clarke, and J. Patrick Henry*. **278**, L103, 36-B7 (1984)
- Temperature and Elemental Abundances in the Abell Cluster A576 Derived from X-Ray Observations. *R. Rothenflug, L. Vigroux, R. F. Mushotzky, and S. S. Holt*. **279**, 53, 37-E6 (1984)
- A Comparison of the Properties of Highly Polarized QSOs versus Low-Polarization QSOs. *Richard L. Moore and H. S. Stockman*. **279**, 465, 43-A5 (1984)
- On the X-Ray Spectrum of the Volume Emissivity Arising from Abell Clusters. *A. R. Stottlemeyer and E. A. Boldt*. **279**, 511, 43-D9 (1984)
- Evidence for Hard X-Ray Emission from Three Clusters of Galaxies. *A. Bazzano, R. Fusco-Femiano, C. La Padula, V. F. Polcaro, P. Ubertini, and R. K. Manchanda*. **279**, 515, 43-D13 (1984)
- The Dynamics of the Narrow Line Regions of Seyfert Galaxies. *Julian H. Krolik and J. M. Vrilek*. **279**, 521, 43-E5 (1984)
- Observations of NGC 4151 at 2 keV to 2 MeV from HEAO 1. *W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini*. **279**, 555, 44-A1 (1984)
- X-Rays from the SNR 3C 391. *Z. R. Wang and F. D. Seward*. **279**, 705, 45-E4 (1984)
- The X-Ray Luminosity Function of Abell Clusters at a Redshift of 0.25. *J. Patrick Henry and Russell J. Lavery*. **280**, 1, 49-A6 (1984)
- Simultaneous Study of Optical and X-Ray Properties of the Coma Cluster by Multi-Mass Models. *G. Des Forêts, R. Dominguez-Tenreiro, D. Gerbal, G. Mathez, A. Mazure, and E. Salvador-Solé*. **280**, 15, 49-B9 (1984)
- X-Ray and UV Observations of Two Radio-bright Quasars. *Martin Elvis and G. Fabbiano*. **280**, 91, 50-A8 (1984)
- A Search for X-Ray Polarization in Cosmic X-Ray Sources. *John P. Hughes, Knox S. Long, and Robert Novick*. **280**, 255, 51-G2 (1984)
- X-Ray Nebular Models. II. Constant Pressure Clouds. *T. R. Kallman*. **280**, 269, 52-A3 (1984)
- Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. *R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt*. **280**, 499, 55-C11 (1984)
- The X-Ray Features of a Single-lobed Radio Galaxy in Abell 754. *D. E. Harris, C. H. Costain, and P. E. Dewdney*. **280**, 532, 55-F3 (1984)
- The Radio Morphology of the X-Ray Radio Sources near 0454 + 844 and 1803 + 784. *K. J. Johnston, P. Biermann, A. Eckart, H. Kühr, P. A. Strittmatter, R. G. Strom, A. Witzel, and A. Zensus*. **280**, 542, 55-F13 (1984)
- Long-Term Observations of X-Ray Sources: The Aquila-Serpens-Scutum Region. *W. C. Priedhorsky and J. Terrell*. **280**, 661, 57-A14 (1984)
- Identification of Two Hard X-Ray Emitting Be Stars Using the HEAO 1 Scanning Modulation Collimator. *J. E. Steiner, A. Ferrara, M. Garcia, J. Patterson, D. A. Schwartz, R. S. Warwick, M. G. Watson, and J. E. McClintock*. **280**, 688, 57-C14 (1984)
- Opacities for Comptonization Plus Emission and Absorption. *Martin A. Schwoerer*. **280**, 809, 58-F3 (1984)
- First Observation of Gamma-Rays from Vela X-1 at Energies Greater than 3×10^{15} eV. *R. J. Protheroe, R. W. Clay, and P. R. Gerhardt*. **280**, L47, 60-D10 (1984)
- The Expansion Age of the Supernova Remnant RCW 89 = MSH 15 - 52 (G320.4 - 1.2). *Sidney van den Bergh and Karl W. Kamper*. **280**, L51, 60-E1 (1984)
- Variable X-Ray Absorption in the QSO MR 2251 - 178. *J. P. Halpern*. **281**, 90, 62-A1 (1984)
- X-Ray Observations of the Burst Source MXB 1728 - 34. *E. M. Basinska, W. H. G. Lewin, M. Sztajno, L. R. Cominsky, and F. J. Marshall*. **281**, 337, 64-E9 (1984)
- Soft X-Ray Active Galactic Nuclei. *Steven H. Pravdo and Francis E. Marshall*. **281**, 570, 68-G12 (1984)
- Nonequilibrium Analysis of Supernova Remnants in the Large Magellanic Cloud. *R. Fusco-Femiano and A. Preite-Martinez*. **281**, 593, 69-A13 (1984)
- The X-Ray Nebula around PSR 1509 - 58. *F. D. Seward, F. R. Harnden, Jr., A. Szymkowiak, and J. Swank*. **281**, 650, 69-E14 (1984)
- X-Rays from Eta Carinae. *T. Chlebowski, F. D. Seward, J. Swank, and A. Szymkowiak*. **281**, 665, 69-G1 (1984)
- On the X-Ray Emission from Crab-like Supernova Remnants. *Stephen P. Reynolds and Gary A. Chanan*. **281**, 673, 69-G10 (1984)
- Stellar Chromospheres and Coronae in the Ursa Major Cluster Stars. *F. M. Walter, J. L. Linsky, Theodore Simon, L. Golub, and G. S. Vaiana*. **281**, 815, 71-D5 (1984)
- Infrared Observations of Galactic Bulge X-Ray Sources. *Paul Hertz*

X-Rays: Sources—Continued

- and Jonathan E. Grindlay. **282**, 118, 75-C2 (1984)
- Recombination Stellar Wind Model for the Coronae of Early-Type Stars. Wayne L. Waldron. **282**, 256, 75-F4 (1984)
- X-Ray Observations of M33 with the High Resolution Imager on the Einstein Observatory: Erratum. Thomas H. Markert and Andrew D. Rallis. **282**, 359, 77-F9 (1984) (Orig. paper in **275**, 571, 143-F14)
- On the Possibility of Resonant Electrodynamical Coupling in the Coronae of Red Dwarfs. D. J. Mullan. **282**, 603, 81-F1 (1984)
- Short-Term X-Ray Variability of the Globular Cluster Source 4U 1820 - 30 (NGC 6624). L. Stella, S. M. Kahn, and J. E. Grindlay. **282**, 713, 82-G4 (1984)
- Determination of the Mass of Globular Cluster X-Ray Sources. J. E. Grindlay, P. Hertz, J. E. Steiner, S. S. Murray, and A. P. Lightman. **282**, L13, 78-A13 (1984)
- Seven Poor Clusters of Galaxies. Timothy C. Beers, Margaret J. Geller, John P. Huchra, David W. Latham, and Robert J. Davis. **283**, 33, 86-D3 (1984)
- A Complete Sample of Quasars at $B = 19.80$. H. L. Marshall, Y. Avni, A. Braccetti, J. P. Huchra, H. Tananbaum, G. Zamorani, and V. Zitelli. **283**, 50, 86-E7 (1984)
- Two Newly Discovered Quasars Closely Spaced across a Galaxy. Halton Arp. **283**, 59, 86-F3 (1984)
- Extended Radio Observations of the SNR CTB 109. V. A. Hughes, R. H. Harten, C. H. Costain, L. A. Nelson, and M. R. Viner. **283**, 147, 87-F1 (1984)
- Einstein Observations of the Crab Nebula Pulsar. F. R. Harnden, Jr. and F. D. Seward. **283**, 279, 89-A12 (1984)
- An X-Ray Survey of a Complete Sample of 3CR Radio Galaxies: Erratum. G. Fabbiano, L. Miller, G. Trinchieri, M. Longair, and M. Elvis. **283**, 469, 91-B10 (1984) (Orig. paper in **277**, 115, 12-B12)
- Very Low Luminosity Active Galaxies and the X-Ray Background. Martin Elvis, Andrzej Soltan, and William C. Keel. **283**, 479, 92-A13 (1984)
- X-Ray Selected Quasars and Seyfert Galaxies: Cosmological Evolution, Luminosity Function, and Contribution to the X-Ray Background. Tommaso Maccacaro, Isabella M. Gioia, and John T. Stocke. **283**, 486, 92-B6 (1984)
- The Medium Sensitivity Survey: A New Sample of X-Ray Sources with Optical Identifications and the Revised Extragalactic Log N -Log S . Isabella M. Gioia, Tommaso Maccacaro, Rudy E. Schild, John T. Stocke, James W. Liebert, Ivan J. Danziger, Daniel Kunth, and Jan Lub. **283**, 495, 92-C1 (1984)
- Spectra from Pair-Equilibrium Plasmas. Andrzej A. Zdziarski. **283**, 842, 96-B5 (1984)
- On the Bizarre Gamma-Ray Spectrum of SS 433. H. L. Helfer and M. P. Svedoff. **283**, L49, 97-B12 (1984)
- New Evidence on the Nature of the Neutron Star and Accretion Flow in Vela X-1 from Pulse Timing Observations. P. E. Boynton, J. E. Deeter, F. K. Lamb, G. Zylstra, S. H. Pravdo, N. E. White, K. S. Wood, and D. J. Yentis. **283**, L53, 97-C2 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda. **284**, 54, 98-E3 (1984)
- X-Ray Observations of Spiral Galaxies. I. Integrated Properties. G. Fabbiano, G. Trinchieri, and A. Macdonald. **284**, 65, 98-E14 (1984)
- X-Ray Photometry and Spectroscopy of T Tauri Stars. F. M. Walter and L. V. Kuhi. **284**, 194, 100-B12 (1984)
- Intense X-Ray Flares from Active Stellar Systems: EV Lacertae and HD 8357. C. Ambruster, W. A. Snyder, and K. S. Wood. **284**, 270, 101-A5 (1984)
- An X-Ray Survey of Variable Radio Bright Quasars. Mark J. Henriksen, Francis E. Marshall, and Richard F. Mushotzky. **284**, 491, 104-E1 (1984)
- X-Ray Emission from Supernova Remnants. II. The Effect of Remnant Structure on Nonequilibrium X-Ray Spectra. A. J. S. Hamilton and C. L. Sarazin. **284**, 601, 105-F2 (1984)
- X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. John J. Nugent, Steven H. Pravdo, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler. **284**, 612, 105-F13 (1984)
- Optical Counterparts for X-Ray Sources in M31. D. Crampton, A. P. Cowley, J. B. Hutchings, D. J. Schade, and L. P. van Speybroeck. **284**, 663, 106-C8 (1984)
- Discovery of a 176 Day Period in 4U 1820 - 30. W. Priedhorsky and J. Terrell. **284**, L17, 103-B4 (1984)
- On the Surface Density of X-Ray Selected BL Lacertae Objects. Tommaso Maccacaro, Isabella M. Gioia, Dario Maccagni, and John T. Stocke. **284**, L23, 109-A6 (1984)
- X-Ray Emission from Stephan's Quintet and Other Compact Groups. Neta A. Bahcall, D. E. Harris, and Herbert J. Rood. **284**, L29, 109-A12 (1984)
- The Prevalence of Cooling Flows in Clusters of Galaxies. G. C. Stewart, A. C. Fabian, C. Jones, and W. Forman. **285**, 1, 110-A6 (1984)
- The Evolution of Nonthermal Supernova Remnants. II. Can Radio Supernovae Become Perleons? R. Bandiera, F. Pacini, and M. Salvati. **285**, 134, 111-D6 (1984)
- The Nonstellar Continuum of the Seyfert Galaxy NGC 7213. J. P. Halpern and Alexei V. Filippenko. **285**, 475, 116-E13 (1984)
- Temperature Relaxation in Supernova Remnants, Revisited. Hiroshi Itoh. **285**, 601, 118-C7 (1984)
- An X-Ray Investigation of the Unusual Supernova Remnant CTB 80. Z. R. Wang and F. D. Seward. **285**, 607, 118-B10 (1984)
- The 1973 X-Ray Transient V0332 + 53. James Terrell and William C. Priedhorsky. **285**, L15, 114-G1 (1984)
- A Hard X-Ray Observation of the 1979 Outburst of Centaurus X-4 with the Franco-Soviet Signe 2 MP (Prognos 7) Satellite Experiment. P. Bouchacourt, G. Chambon, M. Niel, A. Refloch, I. V. Estulin, A. V. Kuznetsov, and A. S. Melioransky. **285**, L67, 121-E10 (1984)
- X-Ray Emission from M82. M. G. Watson, V. Stanger, and R. E. Griffiths. **286**, 144, 123-D12 (1984)
- X-Ray Measurements of the Nonspherical Mass Distribution in the Cluster of Galaxies A2256. D. Fabricant, G. Rybicki, and P. Gorenstein. **286**, 186, 124-A6 (1984)
- Optical Counterparts of the Large Magellanic Cloud X-Ray Point Sources. A. P. Cowley, D. Crampton, J. B. Hutchings, D. J. Helfand, T. T. Hamilton, J. R. Thorstensen, and P. A. Charles. **286**, 196, 124-B2 (1984)
- The Magnetic Field of the AM Herculis Object H0139-68. D. T. Wickramasinghe, N. Visvanathan, and I. R. Tuohy. **286**, 328, 125-D13 (1984)
- The Complex X-Ray Emission of NGC 253. G. Fabbiano and G. Trinchieri. **286**, 491, 128-D14 (1984)
- 3 keV to 2 MeV Observations of Four Gamma-Ray Bursts. J. G. Laros, W. D. Evans, E. E. Fenimore, R. W. Klebesadel, S. Shulman, and G. Fritz. **286**, 681, 130-E9 (1984)
- Limits from the Soft X-Ray Background on the Temperature of Old Neutron Stars and on the Flux of Superheavy Magnetic Monopoles. Edward W. Kolb and Michael S. Turner. **286**, 702, 130-G2 (1984)
- The Extragalactic Nature of H0323 + 022. Bruce Margon and George H. Jacoby. **286**, L31, 132-D2 (1984)
- The Radial X-Ray Brightness Profile of the Coma Cluster. Gary A. Chanan and Frank Abramopoulos. **287**, 89, 134-A1 (1984)
- A Detailed X-Ray and Radio Comparison of Kepler's Supernova Remnant. Y. Matsui, "no x S. Long, John R. Dickel, and Eric W. Greisen. **287**, 295, 136-B9 (1984)
- SAS 3 Survey of the Soft X-Ray Background. Frederic J. Marshall and George W. Clark. **287**, 633, 141-B5 (1984)
- Discovery of a 50 Millisecond Pulsar in the Large Magellanic Cloud. F. D. Seward, F. R. Harnden, Jr., and David J. Helfand. **287**, L19, 138-D5 (1984)
- An Optical Synchrotron Nebula around the X-Ray Pulsar 0540 - 693 in the Large Magellanic Cloud. Gary A. Chanan, David J. Helfand, and Stephen P. Reynolds. **287**, L23, 138-D9 (1984)
- The HEAO 1 A-4 Catalog of High Energy X-Ray Sources. A. M. Levine, F. L. Lang, W. H. G. Lewin, F. A. Primini, C. A. Dobson, J. P. Doty, J. A. Hoffman, S. K. Howe, A. Scheepmaker, W. A. Wheaton, J. L. Matteson, W. A. Baity, D. E. Gruber, F. K. Knight, P. L. Nolan, R. M. Pelling, R. E. Rothschild, and L. E. Peterson. **54**, 581, 9-G12 (1984) (Abstr. in **278**, 896, 35-E14)
- Supernova Remnants in the Magellanic Clouds. D. S. Mathewson, V. L. Ford, M. A. Dopita, I. R. Tuohy, B. Y. Mills, and A. J. Turtle. **55**, 189, 13-F5 (1984) (Abstr. in **280**, 938, 60-B2)
- An X-Ray Survey of Clusters of Galaxies. IV. A Survey of Southern Clusters and a Compilation of Upper Limits for Both Abell and Southern Galaxies. M. P. Kowalski, M. P. Ulmer, R. G. Cruddace, and K. S. Wood. **56**, 403, 29-A9 (1984) (Abstr. in **286**, 822, 132-A13)
- The HEAO A-1 X-Ray Source Catalog. K. S. Wood, J. F. Meekins, D. J. Yentis, H. W. Smathers, D. P. McNutt, R. D. Bleach, E. T. Byram, T. A. Chubb, H. Friedman, and M. Meidav. **56**, 507, 30-G7 (1984) (Abstr. in **286**, 822, 132-A13)
- X-Rays: Spectra
- X-Ray Observations of Broad Absorption-Line Quasars. Joel N. Bregman. **276**, 423, 6-B12 (1984)
- The High-Energy X-Ray Spectrum of Centaurus XR-3 Observed from OSO 8. J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig. **278**, 266, 26-G8 (1984)
- A Sharp X-Ray Absorption Feature in the BL Lacertae Object PKS 2155 - 304. Claude R. Canizares and John Kruper. **278**, L99, 36-B2 (1984)
- Evidence for Variability of the Hard X-Ray Feature in the Hercules X-1 Energy Spectrum. J. Tueller, T. L. Cline, B. J. Teegarden, W. S. Paciesas, D. Boclet, Ph. Durouchoux, J. M. Hameury, N. Prantzos, and R. C. Haymes. **279**, 177, 39-A1 (1984)

- Observations of NGC 4151 at 2 keV to 2 MeV from *HEAO 1*. W. A. Baity, R. F. Mushotzky, D. M. Worrall, R. E. Rothschild, A. F. Tennant, and F. A. Primini. **279**, 555, 44-A1 (1984)
- SMM Observations of K α Radiation from Fluorescence of Photospheric Iron by Solar Flare X-Rays. A. N. Parmar, C. J. Wolfson, J. L. Culhane, K. J. H. Phillips, L. W. Acton, B. R. Dennis, and C. G. Rapley. **279**, 866, 47-C8 (1984)
- Two-Temperature Model of Spherical Accretion onto a Black Hole. M. Colpi, L. Maraschi, and A. Treves. **280**, 319, 52-D11 (1984)
- Soft X-Ray Spectral Observations of Quasars and High X-Ray Luminosity Seyfert Galaxies. R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt. **280**, 499, 55-C11 (1984)
- Hard X-Ray Imaging of the Solar Flare on 1981 May 13 with the *Hinotori* Spacecraft. S. Tsuneta, T. Takakura, N. Nitta, K. Ohki, K. Tanaka, K. Makishima, T. Murakami, M. Oda, Y. Ogawara, and I. Kondo. **280**, 887, 59-D12 (1984)
- The Unusually Soft X-Ray Spectrum of LMC X-3. N. E. White and F. E. Marshall. **281**, 354, 64-G1 (1984)
- Spectral Variability in Early-Type Binary X-Ray Systems. Richard McCray, Timothy R. Kallman, John I. Castor, and Gordon L. Olson. **282**, 245, 76-E7 (1984)
- Short-Term X-Ray Variability of the Globular Cluster Source 4U 1820 - 30 (NGC 6624). L. Stella, S. M. Kahn, and J. E. Grindlay. **282**, 713, 82-G4 (1984)
- Analysis of Magnesium xi Line Profiles from Solar Active Regions. R. L. Blake, R. D. Cowan, H. Felthausen, E. E. Fenimore, M. P. Hockaday, F. Bely-Dubau, P. Faucher, and L. Steenman-Clark. **282**, 784, 83-E13 (1984)
- High-Resolution Soft X-Ray Spectra of Scorpius X-1: The Structure of Circumsource Accreting Material. Steven M. Kahn, Frederick D. Seward, and Tomasz Chlebowski. **283**, 286, 89-B7 (1984)
- Hard X-Ray Variability of Three Active Galactic Nuclei. P. Ubertini, A. Bazzano, C. La Padula, V. F. Polcaro, and R. K. Manchanda. **284**, 54, 98-E3 (1984)
- X-Ray Emission from Supernova Remnants. II. The Effect of Remnant Structure on Nonequilibrium X-Ray Spectra. A. J. S. Hamilton and C. L. Sarazin. **284**, 601, 105-F2 (1984)
- X-Ray Emission from Supernova Remnants MSH 14-63 and RCW 103. John J. Nugent, Steven H. Prado, Gordon P. Garmire, Robert H. Becker, Ian R. Tuohy, and P. Frank Winkler. **284**, 612, 105-F13 (1984)
- HEAO 1* High-Energy X-Ray Observations of Three Bright Transient X-Ray Sources H1705-250 (Nova Ophiuchi), H1743-322, and H1833-077 (Scutum X-1). B. A. Cooke, A. M. Levine, F. L. Lang, F. A. Primini, and W. H. G. Lewin. **285**, 258, 112-F9 (1984)
- The 1973 X-Ray Transient V0332 + 53. James Terrell and William C. Priedhorsky. **285**, L15, 114-G1 (1984)
- Soft X-Ray Opacity in Hot and Photoionized Gases. Julian H. Krolik and Timothy R. Kallman. **286**, 366, 125-G9 (1984)
- On the Origin of Power-Law X-Ray Spectra of AGNs. Isaac Schlosman, Jacob Shaham, and Giora Shaviv. **287**, 534, 140-A7 (1984)
- A Solar Spectral Line List between 10 and 200 Å Modified for Application to High Spectral Resolution X-Ray Astronomy. G. A. Doschek and R. D. Cowan. **56**, 67, 22-F1 (1984) (Abstr. in **283**, 906, 96-F13)
- Zeeman Effect**
- Measurements of Zeeman Broadening in F, G, and K Dwarfs. David F. Gray. **277**, 640, 19-A13 (1984)
- Induced Atomic Orientation, An Efficient Mechanism for Magnetic Circular Polarization. James C. Kemp, Joseph H. Macek, and Frederick W. Nehring. **278**, 863, 35-C9 (1984)
- Upper Limits to Magnetic Fields in C II Regions. Peter R. Silverglate. **279**, 694, 45-D7 (1984)
- Magnetic Field Observations of Evolved Stars. Geoffrey W. Marcy and David H. Bruning. **281**, 286, 64-A12 (1984)
- Measurements of Rotation and Turbulence in F, G, and K Dwarfs. David F. Gray. **281**, 719, 70-E3 (1984)
- The Identification of Hydrogen in Grw + 70°8247. Jesse L. Greenstein. **281**, L47, 67-A1 (1984)







